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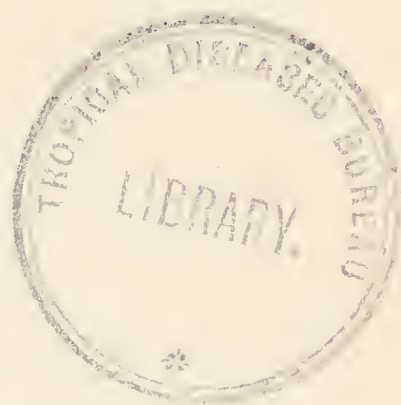
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MALAY POISONS AND CHARM CURES

BY

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PREFACE

EIGHTEEN years' service in the Government of the Federated Malay States, ten of which have been spent in Kelantan, has afforded me time and opportunity to prepare these notes. They are made from consultation with friendly Kelantan "medicine-men" (*bomor* or *pawang*) and converse with other Malay "witch-doctors" (*bomor* or *pawang*), as well as from actual acquaintance with the individual drugs mentioned. The original notes formed a paper on "Some Malay Poisons," which is published by the Government of the Federated Malay States. They are expanded and supplemented by reference to the published works of Mr. H. N. Ridley, C.M.G., F.R.S., M.A.,

formerly Director of the Botanic Gardens, Singapore; to Henry's 'Plant Alkaloids,' published in 1913; Brown's 'Punjab Poisons,' 1888; Skeat's 'Malay Magic,' 1900; and other general sources, including some Dutch authors, chiefly Greshoff and Boorsma. Much scientific work was done in the Malay Archipelago by the late Professor Greshoff, and the poisonous plants described by him and by Boorsma are generally found also in the Peninsula.

We know very little about Malay poisons, and our knowledge indeed of Malay drugs seems to be confined to Ridley's 'Materia Medica,' published in the Agricultural Bulletins of the Straits Settlements for 1906, and afterwards translated into Dutch by Professor Greshoff, of Haarlem ('De Indische Mercur,' 1907). I am greatly indebted to Mr. I. H. Burkill, M.A., F.L.S., the present Director of the Botanic Gardens, Singapore, for a very great deal of help, especially in naming most of the plants.

The flora of Kelantan is but little known, and many of the botanical specimens sent to him for identification have found a resting place in the Herbarium at Singapore, while others have been sent to Kew Gardens.

I must thank Dr. R. Hanitsch, Ph.D., Director of Raffles Museum, Singapore, for identifying a few specimens from the Animal Kingdom, and as Hon. Secretary of the Straits Branch of the Royal Asiatic Society for giving me permission to incorporate my notes on "Some Superstitious Beliefs occurring in the Theory and Practice of Malay Medicine" ('Journ.,' No. 65, 1913) in the present work.

The British Adviser to the Government of Kelantan, my brother officers in this State, and Dr. H. E. Durham, Sc.D., M.B., F.R.C.S., have given me much kindly encouragement and criticism. Mr. R. de Munnick, Assistant, Senambu Estate, Kuantan, Pahang, has supplied me with a good deal of interesting information and some botanical specimens which

were very valuable as cross references. I am also indebted to Mr. W. W. Skeat for a great deal of help.

The witchcraft of the "medicine-man" is always of general interest, but the investigation of Malay medicines, poisons, and their antidotes is of special scientific interest. It presents a large field for medical research, the ground of which is hardly broken in the following pages.

J. D. G.

KOTA BHARU,
KELANTAN, 1915.

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MALAY POISONS AND CHARM CURES

CHAPTER I

THE WORK OF THE *BOMOR* IN RELATION TO CLINICAL MEDICINE

MAGIC maintains its hold firmly in the Far East, and in Malaya the practice of art-magic has not only come down to the Mohammedan Malays by tradition in popular folk-lore, but it persists as a part of their former Pagan religion, which was full of ideas of witchcraft, magical precepts, and hymn-charms. This ancient superstitious faith still survives in the everyday practice of *běr-hantu* (exorcism) and *měnjampi* (the practice of magic). Superstitious and unintellectual Malays still respect the vocation of the witch-doctor or *pawang*. It is his business to give advice in matters of sorcery ;

to propitiate devils and to chide or coax evil spirits as occasion seems to demand. He is generally a specialist, and there will be one *pawang* whose vocation is medicine (*bomor*), another whose province is fishing, another specially skilled in the folk-lore of hunting and trapping and so on. Regarded as a "medicine-man" (*bomor*), he is generally held in honour for his sagacity and for his fortunate use of the curative or remedial plants and other drugs that he may employ. He is a handy man who uses his wits either with or without the aid of the magic art (*ilmu*).

He is also the recognised Malay practitioner, well skilled in the use of local native medicines. Malaya is richly supplied with medicinal plants of minor importance. They form the stock-in-trade of the *bomor*, and their properties seem to be widely known among Malays of all classes, but especially among the dull-witted folk who live in rural districts. Among these medicinal drugs are some poisonous plants whose properties, either deadly (*rachun*) or intoxicant (*mabok*), are just as well known as the medicinal value of the herbs.

There are Malay *bomor* of either sex, but they are generally crafty old men who specialize

in different ways; when dealing with magic they rely upon ghosts or spirits (*hantu*) to help them in their sorcery. Serious cases of poisoning are recognised as being beyond the power of the magician. The ordinary Malay takes it for granted that *hantu* or *jin* cause illness, but curiously enough he does not recognise these ghosts as being necessarily a class of evil spirits, and thinks that they may also control the occurrence and march of disease.

The Arabic word *jinn*—a wonder-working genius—is said by these unsophisticated philologists, not by educated Malays, to be derived from the Malay word *angin* (wind), and they refer naïvely to the *jin* as being invisible like the wind whose origin is unknown. They say, however, that the *jin* have a language of their own by which they can commune with us.

The ghost language in Kelantan is confined to sixteen words, but it is quite different to Kelantan Malay; for example, *sarong* (a sheath or covering, part of the national dress), corresponds to *samar* among these folk; *tělur* (egg) to *buroh*; *mari* (come) is *sahab*; *sireh* (the betel-vine) is *sělambak*; and *mata hari* (the sun) is *sinar*. Skeat gives a different and larger list of specimen words of the spirit

language used by *pawang* in the Appendix to 'Malay Magic,' 1900, but it is interesting to note that the Kelantan *sinar* is the same as *sinar*, meaning a ray of sunlight in other places.

In some notes that were written for me by the Ungku Said Abdul Rahman of Kota Bharu, after conference with the leading *bomor* and other wise men, it is stated that there are two kinds of Malay jin, those that are round about us, and who are creations of Almighty God, and those that haunt the internal economy of man. The *bomor* explain that certain people who have faith, and who are learned in spirit lore (*manusia yang pěrchaya dan bėlajar ilmu měrėka itu*), can actually see the extérnal jin. These ghosts can be seen in unconscious moments or by means of special magic applied by the *bomor* to the finger nails of little boys, a statement which suggests in its application the origin of crystal gazing.

External jin are of many different kinds. Some are denizens of the heavens (*hantu raya, sang raya, langsuir*, etc.), as are all the fairies and elves (*mambang*) such as *dewa* and *pėri*, *indra* and *chandra*. Others are sprites haunting the earth and sea, *jin hitam*, *orang tanah*,

pěnglima sulong, and *hantu laut*, and some wander over the plains (*orang padang*). Some are Indian, some have Sanscrit, some Arabic names. External jin borne on a hot wind or on a cold, wet wind may be helpful to sick people; they cannot of themselves make people ill without the co-operation of the internal jin, whose mundane manifestation is actual disease.

The Malays have no gods like Apollo, the god who in Greek mythology is associated with medicine, or Ixtlilton (Little Dark Brother), the ancient Mexican deity of healing, who specially represent that part of the origin of medicine which has to do with local superstition—with charms and amulets and incantations.

According to the Kelantan *bomor*, disease is sent by God, and it springs from the elements—fire, air, earth, and water. Some diseases which are due to the sun, to food, and other causes have nothing whatever to do with the jin, but others, such as nausea (*mědu*), come from fire, and are associated with yellow spectres, the *jin kuning tělok* and *rantau* (yellow genii of river-reach and bight), also the *anak jin burok api* and others. Jaundice may have suggested this idea. Many illnesses are derived from air (*angin*). In these illnesses the red

jin, or *jin merah*, also *borak rajah-burong*, find means of emphasising their being. Some come from earth, as, for example, vertigo (*pitam*) and smallpox (*pěnyakit orang baik*), and these are associated with the black jin called *něněk jin hitam bala saribu* and the *sěmar hitam sa-gulong bumi*. Many, again, come from water, ague especially, with white spectres, the *jin putěh nur Muhamad* and *Sultan Mahmud Raja di-laut*, co-operating with external jin. In arriving at these ideas it seems that the *bomor*, a man capable of observation, and full of the power of reasoning from observation, is influenced by the meteorological conditions of his country; for instance, the relative recurrence and mortality of prevalent bowel complaints (cholera, typhoid, dysentery, etc.), with hot, dry winds; lung diseases, such as phthisis, with hot, wet winds; fevers following chills caused by cold wind blowing on the wet body, etc., and the converse.

The belief in devils, familiars, and ghosts, with its attendant fears, is so common among Malays that it is not very surprising to find the *bomor* still practising as a specialist in witchcraft, using his or her knowledge to some advantage and trading on the family reputation of a bygone age. And, as elsewhere, the

language of witchcraft revels in the jargon of forgotten tongues and in the case of Malay corrupt Arabic; some of the charms in Kelantan medicine are in the language of the elephant charms quoted in Winstedt's 'Hunting, Fishing, and Trapping' ('Papers on Malay Subjects,' published by the F.M.S. Government, 1911).

The senior "medicine-man" is the *bomor blian*, who is generally a woman, and it is said that when this witch is operating in any particular district all other *bomor* are disqualified for the time being. The spirits called in to help her are the *hantu rimau*, *anak pangan dadong*, *bujang sěmbělěh*, *anak lěnggang padang*, *hantu kuang*, *anak gua batu*, *samar laut*, *raja muda*, and the *dato' jin hitam*, who is the most powerful.

The next in order is the *bomor mambang*, who confines himself to the *hantu* of streams and water, such as the spirit *mambang*, the *arus* (*tali harus*) and many others. Next comes the *bomor putěri*, who has the *hantu raya*, an evil spirit of great power and savagery, among others, in his train. An ordeal in the shape of the "*main putěri*" is very common in Kelantan, but it is never applied to cases of poisoning. Then there is the *bomor mindok*, who calls in

the *putěri bukit tapis*, *gunting di-awang*, *jali di bayu*, *putěri lantong*, and *tělēpok layu*; and the *běrjin*, who call upon *mambang kuning*, *mambang bulang*, *dato' sěmar laut*, *dato' gayang*, *hantu buta*, *hantu bisa*, and *hantu pěkak*.

Some of these names are obtained from Pahang, and I have given them at some length mainly in order to show the extent of the witch's art and craft, but I do not claim to have quoted nearly all the names, and doubtless the same spirits occur under different names in different places.

The Malay "medicine-man" seems to have anticipated in some way the belief of Christian Scientists. In dealing with the origin of disease he says it is because the thought of mankind is fixed upon the disease with increasing persistency that the disease grows, but he also says that sometimes the mind is thus fixed on the disease owing to the strength of the spirit imported by the external jin.

As a practical man he is well aware of the value of the ceremony, of mystery, and peculiar elocution in his *rôle* as a magician or wizard. Powerful incantations, that are difficult to understand, are essential, as well as a great noise. The *bomor blian* and the *bomor mambang* utter

their spells to the accompaniment of the tam-bourine (*rěbana*), the *bomor putěri* and the *bomor mindok* work with that of the Malay viol (*rěbab*). The *běrjin* use no musical instrument.

Two examples of old spells have been given me by *bomor* in the "up-country" districts of Kelantan. One of them is intended to neutralise the power of the forest spirits and demons :

Peace be with thee ! Forest Lord and Jungle Chief,
Whose realm is the world !
Prince whose sway is over this jungle land !
Well know I thee whence thou art sprung.
Aforetime thou wast styled *Lang Juna*,
Child of the Lordly Forest, the Mighty Mountain,
Of the Fairest White Saddle and of the Ocean !
Hearken to the tale of thy birth !
Child of the Darkness thou ! I of the Sunshine !
Sprung art thou from unsubstantial clay,
I of sturdier mould and older far than thou !
Hail ! all ye Spirits of these mountains,
Of this forest and vasty space !
Mark well my words, else are ye accursed of the Ancient
Deity,
Who is ever alert ever unseen,
Undescribable by the eye and tongue of man !

The other is a charm to cure a patient of smallpox.

Verily, I know Smallpox ! that in the beginning
Thou didst dwell formless in the depths of Hell,
Whence issuing thou didst enter the children of Adam, in
visible form,

Seven brothers were ye in all :

Born of the black exudings, of black pores, of black skin,
Of black flesh, blood, veins and sinews, of black bones.

Not mine this charm but that of the *Dewa Sang Sarimba*,
Not mine this charm but that of the *Dewa Bentara Narada*,
Not mine this charm but that of the very dregs of Hell.

Well versed am I in all poisons

And can quench fiery pains :

Poison do I charm away, fiery pains I soothe :

Helpeth me my teacher, yea, I too help my very teacher's
self !

Other illnesses attributed to evil spirits are mentioned by different authors, especially Skeat and Blagden. The former describes the ceremony of marking the forehead of the newborn infant to preserve it from convulsions and the use of a bracelet called *gělang bajang* to protect Malay children from a devil in the form of a pole-cat. But among amulets which are worn to ward off disease the *azimat* or written talisman is the most common. Sir Hugh Clifford has described the horrible wraith of the lying-in-room in his novel 'In Court and Kampong'; this evil thing is attended by a familiar spirit in the shape of a vampire-cricket (*pělēsit*).

The *pěleşit* is exorcised in Kelantan by means of the following spell :

Vampire ! well do I know thee
Begotten of the after-birth,
Engendered of the bloody discharge,
“ *Kaman* ” thy name !
Gazing skyward thy vomit be blood,
Bending earthward thy vomit be ordure.
In the name of Allah and his Prophet !
With the blessing of Mohamad, the Prophet !

Or by another kind of incantation such as :

Flitting spirit of the sky and earth !
Monster of the sky and earth !
Mighty monster the name of thy sire !
Devil thine own name and Curse that of thy slave !
Hence in the name of Allah !
With the blessing of Mohamad, his Prophet !

A spoken charm used in Kelantan for snake bite, the stings of centipedes and scorpions, and for other cases of poisoning is this :

Peace be with you !
Potent in sooth this charm !
Fain would I charm this into the flesh,
The veins, the sinews,
Charm this into the bones !
Charm given of Allah, given too of Mohamad,
His Prophet !

The medicine given is “ liquid opium mixed

with the ashes of a cat's whiskers"! Another charm for neutralising the effect of poison was given me in confidence by To' Bomor Inche' Abdullah, a chief *bomor* to H.H. the Sultan of Kelantan.

This the all-powerful spell!
Better than the hundred and ninety.
Not my own spell, but that of all that is deadly!
Poison! well wot I thee born of the deadly water,
Born of the green and deadly berry!
Fain would I charm thee from out this body!
Obey not and I will curse thee with the cursings of
the Prophet Isa, father of the charm,
In the name of Allah!

Fresh coco-nut water is used as an antidote along with this charm, but the coco-nut water must be obtained from the dwarf coco-nut palm which is known as *pokok nyiur puyoh*. This coco-nut water is placed in a bowl; juice squeezed from the red sugar-cane (*těbu merah*, *t*, *tělur*) is added, and then the *bomor*, while repeating his charm, blows three times into the bowl and finally administers the potion. If the jaws are clenched, the *To' bomor* told me that the mouth must be forced open with a stick if necessary.

An ancient spell, which is intended to be a counter-charm to any kind of poison, was

obtained from an old *bomor* in the interior of Kelantan, and on translation proved to be of some interest, because, by reference to the white elephant and the mystic white stone, it shows the influence of the Siamese and Javanese among Kelantan folk.

The spell! the mighty spell, that of the hundred and ninety!

The charm is not mine, but that of the fair-faced *Dato'*
Mengkadom

Springs its virtue from the white "roc,"

And the white elephant!

Springs, too, from the mystic white stone,

White blood, white bones, and the white (sincere) heart.

With it have I charmed away the salt from the sea,

Yea! and thee too will I charm!

I pray that my spell may charm away its venom,

If poison is here, if it is poison burning as a fire,

I pray it may quench it!

The rendering of these charms into English is very difficult, and I am greatly indebted to one of my brother officers for his help. The original texts from which they have been translated are given in Appendix I in romanised Malay.

One of the special prerogatives of the old Malay Rajas was crystallised in the phrase "*tikam ta' bĕrtanya*" (to slay without anyone's

asking why), and the idea of this ancient right is still preserved in an old charm. It is given in order to show how very real the belief of the Malay is in regard to the precaution that should be taken against evil spirits. The charm is a Kelantan one, supposed to cure a man who had become dazed by the Will-o'-the-Wisp.

Peace be with thee, O Jin, son of Jan !
O Devil, son of Serdan Peraon,
Know that I am the chief of Executioners,
Blind am I, and slay without question asked,
Slay too the innocent without being guilty of a crime.
I, in sooth, am Lord of all living things !

Muttered charms are not used in Kelantan during the process of mixing poisons with criminal intent. The commission of murder by means of poison (*rachun*) does not seem to appeal strongly to a Malay. It is commonly accomplished in a fit of passion or jealousy by stabbing with the national weapon, the *kris* (a dagger), with a spear, or by slashing with the narrow-bladed Malay chopper, as well as by the more deliberate use of firearms. The feeling of true satisfaction (*puas hati*) would seem to be incomplete to Malays when murder is ac-

complished by the agency of poison alone. The Dato' Lëla Dërja and the Ungku Said Hussëin of Kota Bharu have told me that poison is sometimes smeared on the blades of Malay weapons with criminal intent, but, as a general rule, vengeance by means of poison alone is attempted only when violent or other measures appear to be too dangerous or too uncertain. Very often when jealousy or a desire for revenge inspire them, the intention is merely to cause annoyance or injury less serious than death. Malay thieves, again, frequently use poisonous plants to cause no more than the stupefaction (*mabok*) of their victims as a preliminary to the main venture. Suicide by poisoning, or indeed by any other means, except perhaps in "running amuck," is almost unknown among Malays.

The men lend themselves by their lazy habits to the rather easy administration of poison in food; for, whenever possible, the trouble of cooking is left entirely to Malay women, and they are the accredited agents in most cases of poisoning.

Some of the poisons used in Kelantan are common to India; for example, *Plumbago rosea* (*chëraka*), *Excoecaria aggallocha* (*babuta*),

Datura fastuosa (*kěchubong*), opium (*chandu*), arsenic (*tuba tikus*).

The *bomor* does not hesitate to use poisonous drugs as medicines, especially, perhaps, *Datura fastuosa* (*kěchubong*), *Alocasia denudata* (*kěladi chali*), *Goniothalamus tapis* (*kěněrak*), *Glycosmis pentaphylla* (*něrapih*), opium (*chandu*), and white arsenic. Indeed, as regards poisons derived from the vegetable kingdom, all of those I mention, except *babuta*, *pokok batu pělir kambing*, *akar batu pělir kambing*, *langkup*, *ibul*, *ipoh batang*, *ipoh akar*, *rěngas*, *binjari*, *ringut*, and *tuba* are used as Malay medicines.

With regard to the animal kingdom, the bile of the bear, of the porcupine, of the crow, and especially that of the king crow, are all highly valued as practical medicines by the Kelantan *bomor*, but their use as well as the use of the bones of rare animals, strongly suggests the idea of "make believe" or sympathetic magic. Hairs derived from a tiger's tail and those from an elephant's tail are burnt and given in water as an internal medicine, or the ashes mixed with oil are applied externally. The curious use of a cat's whiskers as an antidote has already been referred to.

Great attention is paid by the *bomor* to the

proper combination of drugs for curative purposes, and so also with poisons. Some of the poisonous preparations, especially those which act through the skin, are devised with a refinement of cruelty. It is said that an accomplished Malay criminal can give a single dose of poison and time the death of his victim within three months, six months, or even three years, according to the dose and the particular combination he uses. No clinical case of this alleged evil practice has come under my own observation. Rogues claim to be able to cause loss of voice lasting for seven or eight days by the administration of certain poisons by the mouth. I have seen two or three clinical cases in Kelantan, in which it was alleged that witnesses in court could not give evidence for this reason. Aphonia was complete but temporary, but the poison could not be produced. A Kelantan *bomor* told me that a powder made with the lime (*kapur*) used in betel chewing, and bits of the smooth, dry, shiny inner bark of a rattan—the familiar “cane” of school-boy days (*rotan sěga*; *Calamus* sp., *Palmæ*)—was used for this purpose. In 1914, this powder was prepared according to his directions, and given in water, by arrangement, to a strong Chinaman in the State

hospital at Kota Bharu, but it had no effect whatever.

Quite harmless things are often avoided when combined, because they are said to be poisonous in combination; for example, the mangosteen fruit with sugar, water-melon alone with honey, the heart (*umbut*) of the coco-nut palm with shell-fish, the heart of the *nibong* palm with oysters.

In nearly all cases of Malay poisoning the prompt administration of fresh coco-nut water (*ayěr nyiur*) is regarded as a very valuable remedy, and it may be of practical value. Coco-nut water is slightly acid, diuretic, and contains much sugar with a small proportion of fat. Emetics do not seem to be specially employed as in European practice.

The *bomor* has antidotes (*pěnawar*) ready for every kind of poison, of which many are made up of products from the animal and vegetable kingdoms, but all of them must be used along with the supernatural aid of a magic spell. The cure of the patient depends, in most cases of minor poisoning, upon the talismans and amulets that he happens to wear, on his conservative faith in old traditions, and on the spells (*tawar*) uttered by the magician who is called in to treat him.

CHAPTER II

FISH USED AS POISONS BY MALAYS

THE IKAN SĚMBILANG.

A genus of fish with very poisonous fins, the *ikan sĕmbilang* (*Plotosus canias*, *P. unicolor*, *P. lineatus*, and, perhaps, *P. horridus*), is found in Malayan waters, and curiously enough the *ikan sĕmbilang* occurs as an antidote which is made by steeping the fish-bones along with those of a goose in a bowl of water. This antidote is intended to cure baldness which has been caused with criminal intent.

The poison for this purpose is smeared over the victim's head during his sleep, and is a gummy fluid made by boiling down a cobra (*ular tĕdong sĕndok*; *Naia tripudians*, *Colubridæ*) in water with a similar decoction obtained by stewing a box-tortoise (*kura katup*; *Cyclemys amboinensis*) in water. The appli-

cation is said to cause death if untreated by the *bomor*.

In regard to this tortoise (*Cyclemys amboinensis*), it is interesting to note that it lives in swamps and paddy fields, and that if it bites it will not let go until a thunder-storm comes on. Kelantan Malays affirm that the *kura kura katup* or box tortoises are very afraid of thunder, but this seems to be an example of a Malay pleasantry. Skeat records that the bite of the common brown toad (*katak puru*; *Bufo melanostictus*, Cantor) is deadly and poisonous ('Malay Magic,' p. 305), but none of the tortoise family and none of the toads possess any teeth!

THE IKAN KĚLI.

A cat fish (*ikan kĚli*; *Clarius magur*, Siluridæ) has an evil reputation among some Malays; like the peacock, it is held by them to be unclean, and many will not eat it. The gall (*ampĕdu*) of the *ikan kĚli* is used as a poison in combination with datura and other things in Kelantan. But the fish is quite commonly cooked and eaten as food throughout the State; it is a long, scaleless fish found in the paddy swamps. Poisoned wounds may

be caused by the lateral spines of the *ikan kěli*. It is believed that, if the brain of the fish be removed and rubbed into the wound it has caused, it will neutralise the poison, and the wound will heal. A ligature made of a woman's hair is also supposed to be a magic antidote to this kind of wound.

THE ULAT BULU LAUT.

Ulat bulu laut (*Chloia flava*, Annelida) is a sea-worm; the bristles are very irritating and are much dreaded by Malay fishermen on account of the serious wounds they cause. As a poison, the bristles of *ulat bulu laut* are generally used in combination with other things, especially *buah ringut*; they help to make up some of the more cruel and disgusting of the Malay poisons. This marine worm is similar in appearance to the "sea-mouse" (*Aphrodite*) of English tidal waters, its Malay name actually signifies "sea-caterpillar."

THE IKAN BUNTAL.

The poisonous fish, *ikan buntal*, afterwards referred to as being administered as a poison with *buah ringut*, is a tetrodon or puffer. These globe-fish occur in Malay rivers and

have the reputation of being highly poisonous as food, in addition to which they frequently attack bathers and others who have occasion to enter the water.

They bite by means of a sharp-edged kind of double beak, inflicting, generally, on the genital organs of the male, wounds which may be very serious and painful, but I have known bathers at Kota Bharu to be bitten at evening time on the fingers and toes without serious effect. Specimens sent from Kelantan to the British Museum (Natural History) have been identified as *Tetrodon fluviatilis* and *T. oblongus*. However the more serious effects arise, whether from the anatomical position of the wound, from the presence of poisonous mucus in the mouth of the fish, or from the injection of some venom at the time of the bite, the tetrodon are easily avoided, as those fish are said not to attack objects in motion.

Scheube says with regard to *Tetrodon fluviatilis* (Indo-China) that they are provided with poison teeth on their palates much in the same way as the conger-eel (*Muraena helena*, Linn.), and as a dangerous fish occurring in the Mediterranean Sea (*Stomias boa*, Risso). Poisoning by tetrodon is common in Japan,

where they are often used for suicidal purposes ('The Diseases of Warm Countries,' Scheube, 1903, p. 345).

Severe constitutional as well as local effects occurred in the case of a Turk who was bitten on the genital organs by one of these *ikan buntal* in the Kelantan river in 1910. He was bathing about ten miles away from Kota Bharu late in the evening. The bite was a very nasty one, a piece about the size and shape of a six-pence was bitten clean out. The parts became much swollen, and the place of the bite soon sloughed. It was many days before the man could walk about, but he eventually made a good recovery (*vide* 'The Field,' July 15th, 1911, No. 3055, p. 177).

THE IKAN PARI.

Another dangerous fish which occurs on the coast and at the mouths of some Malay rivers is also used as a poison in Kelantan along with *buah ringut*. It is a sting-ray (Trygon), which can inflict very painful and gangrenous flesh wounds by means of spines as well as by the stroke of its whip-like tail. These wounds are more severe than those caused by mere

mechanical laceration, and seem to be poisonous through bacterial infection. The dermal teeth, two exposed spines or bones near the base of the tail (sometimes only a single bone or spine), are sharply pointed, narrow and finely serrated. They are known to Malays as the *sonak*, but in Kelantan and on the east coast of the Malay Peninsula they are generally called *sěngat*. The name is probably connected with the west coast *sondak* used in Selangor of the spikes or spears of jungle grass.

No special poison glands in connection with them could be found on the dissection of specimens bought for a few cents in the Kota Bharu fish market. The *ikan pari* is not poisonous when cooked and used as food by man, but when exposed for sale the *sonak* are invariably removed.

In August, 1913, Dr. Rankin showed me a specimen of *sonak pari* in his laboratory in Bangkok. It had been accidentally swallowed by a Siamese girl and was subsequently removed by Dr. H. Havelock Hepburn from an abscess which it had caused at the back of her neck. The fish had been boiled. Dr. Campbell Highet tells me that he has since met with a similar case in his practice in Bangkok. In 1914 Dr.

L. H. Taylor also removed one of these poisonous fish spines at the State hospital in Kota Bharu. The patient had been stabbed in the back with it by a Siamese.

In July, 1913, at Cherang Jelor in Kelantan, some Malays, with devilish ingenuity, fastened a couple of these *sonak* to a pole and stabbed a horse in the flank out of malice. The pain that resulted was severe enough to throw the animal into a state of delirium, and it seemed at one time likely to die from the effects of two small flesh wounds caused by the stab. The wounds were enlarged and treated with a two per cent. solution of iodine. The animal, a valuable race horse, recovered, probably owing to the fact, as the Malays said, that the *sonak* had not broken off and stuck in the wound.

CHAPTER III

OTHER POISONS DERIVED FROM THE ANIMAL KINGDOM

THE BILE AND BONES OF ANIMALS.

Ampědu, lit., bile or gall, derived from various birds and animals, is a common ingredient in many of the cruel and repulsive poisons that are concocted by Malays. Probably its use in a practical poison is either as a “make-believe” or to give a finish to a known deadly combination.

In Kelantan the “gall” of the fish *ikan buntal*, *Tetrodon fluviatilis*; that of *ikan kěli*, *Clarius magur*; of a frog, *katak pisang*, *Rana erythæa*, Schleg; of two kinds of toad, *katak lěmbu* or *běrtandok*, *Megalophrys nasata*, Schleg., and *katak puru*, *Bufo melanostictus*, Schn.; of the sun bear, *Helarctos malayanus*; of a green snake, *Dryophis prasinus*, Boie; of the porcupine, *Hystrix longicauda*; and of two sorts of bird—the crow, *burong gagak*, *Corvus macro-*

rhynchus, Wagl., and the king crow or racquet-tailed drongo, *burong chawi* or *chěn-chawi*, *Dissemurus platurus*, are all used as constituents of the poisonous combinations in vogue.

It is curious that the common green tree snake, *ular puchok*, *Dryophis prasinus*, should be the only one used out of the many poisonous snakes in Malaya. These belong to the four groups: (1) water snakes, *Hydrophiinæ*, (2) cobras and their allies, *Elapinæ*, (3) *Amblycephalidæ*, and (4) the vipers, *Viperidæ*. The bite of the green tree snake, *Dryophis prasinus* (*Dipsadomorphinæ*) is non-venomous.

When *ampědu* (bile) is used by itself as a Malay poison the bile of the green tree snake is mixed with that of the green water frog, *Rana erythræa*, Schleg., and that of the jungle crow, *Corvus macrorhynchus*, Wagl., and the preparation is said to cause the appearance of blood in the urine. It is smeared over the inspissated juice of *Uncaria gambier*, Roxb., *Rubiaceæ*, which is used in chewing betel with other things, and which causes the red stain which is so noticeable in this practice.

The bones of the goose seem to be endowed with magic properties, and are often used by the *bomor*. They are ground down with the

root of the coco-nut palm (*pokok nyiur*, *Cocos nucifera*, *Palmæ*), and given as an antidote to datura poisoning. This is given in water.

A *bomor* to H.H. the Sultan of Kelantan tells me that a universal cure for any native poison can be prepared from the wing-bone of a goose, the horn of the wild goat, the spine of the sea porcupine, and various yet unidentified jungle roots and barks. These are to be rubbed down in hot water and carefully strained before administration.

In the case of snake bite this sovereign remedy is to be applied first to the top of the head and then to the wound before it is swallowed by the patient. A powerful charm must be said at the same time by the *bomor* in attendance.

Goose bones again are often used as a medicine. One example of an empirical prescription containing them and used by the *bomor* in the treatment of Yaws is sufficient:

“Take the knee-cap of a tiger, the bones of a *duyong* (the dugong), the bones of a goose, the bones and horns of a *kambing gěrun*, *Nemorrhædus sumatrensis* (a rare wild mountain goat), the horns of a *rusa*, *Cervus unicolor* (a wild deer), when full grown (*lěmbong*); add

bĕlerang bang, or realgar (one of the sulphides of arsenic), and *chĕndana janggi* (red sandalwood), and *mĕmpus harimau* ('kill-tiger,' a kind of wood). Grind these ingredients down with some boiling (*dideh*) rice water, take a small amount of ashes from the hearth, mix, and administer the draught by the mouth."

The disease known as Yaws is very common in Kelantan, but this prescription, which is mediæval in quality, is really seldom used by the *bomor* in general practice.

The wearing of a turquoise ring is considered to be a sort of amulet for warding off poisonous snakes. A magic wood from Mecca, the *kayu raja naga*, is sometimes carried about with the same idea; it is a light brown friable stem which is also applied to a wound as a remedy for snake bite. This practice is somewhat similar to the use of the "snake stone" used by Hindu snake charmers and snake catchers, as well as by Malay *bomor*, and to an ancient amulet used in Cyprus to protect the wearers from the bite of venomous animals. In Malta a similar amulet consisted of the stones (supposed to be shaped like the liver, heart or tongue of a viper) which are found in that island in the traditional cave of St. Paul.

MILLEPEDES, CATERPILLARS, AND SNAILS.

In Kelantan the juice obtained by crushing the common millepedes is a favourite excipient for many of the set poisonous preparations, especially those containing *buah ringut*. The pill millepede (*pinang kotai bukit* or *kosai*, *Zephronia*) is used, as well as the black variety of *jělantor* (genera *Spirostreptus* and *Thyropygus*), found in dense jungle. The *jělantor* is known as *chalutong* in Pahang and as *ulat gulong bidai chěrang* in Kelantan; the small red millepede *talang* is not considered to be poisonous.

Among the many poisonous hairy caterpillars of Malaya, the fine hairs of *ulat bulu darat* are chosen in Kelantan for internal administration in combination with *buah ringut*, bamboo hairs and other irritants.

One of these black caterpillars was reared in Kota Bharu, and the imago proved to be the moth, *Aloa sanguinolenta*, Fab. Under the microscope the dry hairs of this caterpillar can be recognised as black, slender filaments, bearing short, sharply pointed barbs arranged alternately.

A common and rather large land snail (*kěchar*

lakum, *Nanina humphreysiana*, *Stylommato-phora*) is crushed and used much in the same way as the millepedes as an excipient.

THE BEETLE DĚNDANG.

Děndang is used by Malays both as a medicine and as a poison. It is a small beetle, very like the "Spanish Fly" (*Cantharis vesicatoria*, Latr., Coleoptera), which is found feeding on a fern (*daun paku hijau*, *Gymnogramme calomelanos*, Kaulf., Filices). It is met with in May and June, but is otherwise rather uncommon.

In length it is about half an inch and about a grain and a half in weight. Malays say that these beetles drop from the heavens during the fifth month of the Mohammedan year, overlooking the existence of the larva which inhabits the earth.

The beetles are used medicinally by the *bomor* in the treatment of chronic gonorrhœa and disorders of menstruation (amenorrhœa). For use as a medicine the insect is divided into seven equal pieces, and a piece is taken every day with a chew of betel (*makan sirěh*). They are greatly treasured when found, and are killed, dried, and are generally kept in a bottle to prevent their decay.

As a poison, a single *děndang* is dried over a fire until it becomes crisp ; it is then powdered and the whole of it is mixed into any kind of native cake. It may blister the mouth, but acts chiefly on the kidneys, causing a frequent irrepressible desire to pass water, which is done only with pain, straining, and blood in the urine.

Děndang is a cantharides beetle similar to, if not identical with, a black species found in Assam (*C. hirticornis*, Haag., Coleoptera). This kind has a red head ; it occurs abundantly in Assam, where it is found feeding on spinach (*Amaranthus*) and other vegetables. A red-brown species (*Illetica testaceæ*, Fab.) is also found in Assam during the rains (' Indian Insect Life,' H. Maxwell Lefroy, Agricultural Research Institute, Pusa).

Both kinds, black and red, are known to Malays. Aphrodisiac properties are generally ascribed to the cantharides beetle, but practically no effect of this sort can be obtained unless the drug is taken in almost fatally poisonous doses.

From a medico-legal point of view it is important to remember that when these beetles undergo putrefaction the elytra or fore-wings of the insect resist the process of decay for a

very long time, and this is especially the case with the red variety of the *děndang*, where the elytra are most densely chitinised. Hence specks of powdered *děndang* may be detected at an autopsy held many months after death. The word *děndang* is also commonly used in Malay for a crow, especially in Kedah, and it occurs in many proverbs.

CHAPTER IV

SOME MALAY POISONS DERIVED FROM JUNGLE PLANTS

RINGUT.

THE *ringut* tree (*Epipremnum giganteum*, Schott, Araceæ) is a large, climbing jungle aroid, with huge, stiff, green leaves and a spike of green flowers wrapped in a large spathe, arranged together like the corn cob or head of maize. *Ringut* is common all over the Peninsula; the leaves are oblong and one or two feet in length. The plant forms a common ingredient in many Malay poisons; it is generally referred to as *buah ringut*, lit., the ringut fruit. As in the case of many aroids, the liquid contained in the spathe of flowers is very irritating to the skin.

Minute transparent crystals, raphides, abound in the spadix, and as these plant crystals are

generally composed of oxalate of calcium, perhaps the irritant action of *buah ringut* when administered internally may depend upon a chemical action set up by the acid of the gastric juice.

When the *ringut* fruit decays, the softer tissues perish, liberating an innumerable number of bast cells from the wall of the carpel of the flower; they look like fine, sharply-pointed hairs, and under the microscope among them may be seen masses of the needle-shaped crystals. This decayed tissue is well known to Malays to be very irritant; it is practically composed entirely of needle crystals and bast fibres. As a poison *buah ringut* is either mixed in with cooked rice, or given in water, suspended in the "gall" of the fish *ikan buntal* (*Tetrodon fluviatilis*), or the fruit, in combination with other things, is put into wells, the latter being a not unusual method of administering other Malay poisons also.

In 1912 a well at Tabal, a small fishing village on the sea-coast of Kelantan, was treated with *ringut* in combination with the millepede, *pinang kotai bukit*, and the marine worm, *ulat bulu laut*. These were weighted and sunk by means of a "thunder-stone" (*batu lintar*) to which they were attached. The

people concerned experienced pain and distension of the stomach, but were not seriously ill.

For administration by the mouth, a poisonous preparation is made by combining *buah ringut* with the bristles of the marine worm and the roasted body of a jelly fish (*gěronggong laut*). The three ingredients are then suspended in mucus, which is obtained by crushing the pill millepede and a land snail (*Nanina humphreysiana*).

A similar vehicle for the administration of *buah ringut* is prepared by crushing the pill millepede in the same way, and adding the gall of the honey bear (*ampědu běruang*; *Helarctos malayanus*), and the gall of the horned toad (*ampědu katak lěmbu*; *Megalophrys nasuta*, Schleg., *Pelobatidea*).

According to Vaughan Stevens and Skeat, *buah ringut* is used for mixing with *ipoh* in the preparation of dart poison by Sakei, but these aborigines seldom gather the dry fruit, because the dust which is present may cause blindness. (Ridley, 'Agricultural Bulletin,' S.S., No. 8, p. 215, Dec., 1898).

When taken internally it is said to cause distension of the abdomen amounting to dropsy (*busong*), followed by cough, emaciation, and

terminal intestinal hæmorrhages. The following prescription, for which there is no antidote, was given to me by the head-man of the Kusial district in Kelantan, a district with an evil reputation in the art of poisoning: Take the bristles of the annelidine worm (*ulat bulu laut*), the hairs of the caterpillar (*ulat bulu darat*), the juice of the millepedes (*pinang kotai* and *jělantor*), the bile of the frog and the crow (*ampědu kata puru* and *burong gagak*), bamboo hairs (*miang rěbong*), and *ringut* fruit (*buah ringut*), mix them, then add shreds of the dry *ibul* nut. The effect of this mixture is said to be a cough with the spitting of blood, quickly followed by insensibility and death.

The *ibul* nut is about the size of a walnut. It is hard, round and almost solid, with a fibrous epicarp, like an areca nut. It is the fruit of a large thornless jungle palm found on high ground (*pohun ibul*; *Orania macrocladus*, Mart., Palmæ). The fruit is held in Kelantan to be exceedingly poisonous, especially to quadrupeds, and it is said that a single fruit is sufficient to kill an elephant. The heart of this wild palm (*umbut*) is also alleged to be poisonous, but Sir Hugh Clifford refers to the shoots as being edible in Pahang ('Studies in Brown

Humanity,' 1898, p. 232). The tree is not common in Kelantan, but it can be found on Bukit Gadong in the Kusial district. A number of seeds from this place have been collected and sent to England for chemical analysis.

In October, 1913, pieces of a dried *ibul* nut were given in fish to the lesser adjutant bird (*Leptopilus javanicus*) in Kota Bharu. They were refused with some display of anger, but one small piece that was swallowed apparently had no ill effect. The bird had been experimented upon before with the fruit of two other poisonous plants.

A preposterous antidote for poisoning by *ringut*, when used as a deadly poison (*rachun bėsar*) in combination with other poisons, is to take the bones of a whale, the solid casque of a horn-bill (*těbang měntua*, also *burong lilin*), a sea porcupine's spine, a stag's horn, and the horn of a rhinoceros, and rub them down together in hot water; the draught is then administered internally.

THE BĚRĚDIN PALM.

Many other Malay plants beside *ringut* are put into wells for the purpose of poisoning,

and among them is *buah bĕrĕdin* or *mĕrĕdin*, the fruit of the *mĕrĕdin* or *tukas* palm (*Caryota mitis*, Lour., Palmæ).

Bĕrĕdin is a wild as well as a cultivated palm, with a white flower not unlike that of *Areca catechu*, Linn., Palmæ. The fruit is in the form of a small red berry; it is put into wells with intent to cause annoyance. Bathing with well water that has been treated in this way gives rise to an intense itching of the skin and may cause an acute inflammation of the eyes. The fresh juice of the berry is very irritating to the skin; its use as an external irritant is referred to under the heading "Bamboo."

LANGKAP AND KABUNG.

Juice obtained from the fruit of the large *langkap* palm (*Arenga obtusifolia*, Mart., Palmæ) is also used as a poison. The pulpy part of the fruit is boiled and crushed, and the juice, after straining, is administered in coffee. It is said to cause dyspnœa and restlessness.

Madinier, quoted by Greshoff ('Mededeelingen uit 'Slands Plantentuin,' x, p. 153), says that the ripe *langkap* fruit is an irritant to the

mucous membranes. It causes an acute swelling of the mouth and fauces when taken internally, and this probably is due to the mechanical irritation of needle crystals. In the Philippines it is used by the Tagelo for poisoning fish.

The juice of *kabung* or *běrkat*, the sugar palm (*Arenga saccharifera*, Labill., Palmæ), is said to be used by Malays as a poison in the same way as *langkap*.

BAMBOO.

The very fine hairs—almost black specks—found on the sheath leaves of the young sprouts of certain bamboos, also the fine hair-like pieces of bamboo seen when a bamboo is split or broken, often figure in descriptions of Malay poisons, either in combination with other things or perhaps used alone. They are called *miang rěbong* or *miang buluh* (*miang*, itchiness; *rěbong*, the young shoot of the bamboo; *buluh*, bamboo), and are obtained from bamboos with edible shoots such as the *buluh duri* (*Bambusa Blumeana*, Sch., Gramineæ) and the *buluh minyak* (*Oxytenanthera sinuata*, Gamble, Gramineæ).

Under the microscope the fine hairs are seen as brown, acuminate filaments like small broken needles. They (*miang buluh*) are frequently

used with no other adjuncts than powdered glass. The administration of them alone, or even with the addition of powdered glass, does not seem to cause death directly, but rather to set up a train of symptoms like that of a chronic pseudo-dysentery.

Bamboo hairs are sometimes mixed with the juice of *měředin* berries and an extract of a dead toad (*katak puru*; *Bufo melanostictus*, Cantor) which has been allowed to decompose for seven days in a bamboo cylinder containing a little water. This application is smeared or sprinkled over wearing apparel, and is said to set up an incurable and painful skin disease like a ringworm (*kurap*) in appearance. *Bufo melanostictus*, Cantor, is a common brown toad in Kelantan.

KACHANG BULU RIMAU.

In June, 1913, a Kelantan police exhibit consisted of some rice cooked with a green vegetable (salted) called *maman* (*Gynadropsis pentaphylla*, D.C., Capparidaceæ), and a quantity of fine woolly hairs scraped from the pod of an edible bean, *kachang bulu rimau* (*Glycine hispida*, Maxim., Leguminosæ).

An attempt seemed to have been made to

poison or incapacitate for the time being (pending a law suit) a cousin of His Highness the Sultan of Kelantan. Three of her women who partook of the meal were attacked with vomiting, diarrhœa, and general prostration, with violent itching of the skin in one case; they all recovered quickly with treatment by castor oil and a bismuth mixture.

A wild uneatable bean (*kachang rimau*; *Mucuna gigantea*, D.C., Leguminosæ), which is well known in India for its urticating properties, is a much more serious poison if administered internally. It grows along river banks or in hollowed-out beds of jungle streams (*alur*). Dark red and yellow hairs cover the pod, suggesting in colour and arrangement the skin of a tiger (*rimau*). They are intensely irritating to the skin and under the microscope can be recognised by having a series of short wide-based spines. The light yellow hairs of *kachang bulu rimau* do not present any peculiar features under the microscope.

JĚLATANG.

The tree-nettle, *jĚlatang gajah* (*Laportea crenulata*, Forst., Urticacæ), also called *daun gatal* and *rumpai* in Pahang and other places,

furnishes a very dangerous kind of vegetable hair. It is a soft-wooded shrub of no great size that grows along the river side and in ravines, being rather uncommon, but being found in Kelantan, Selangor, Pahang, Perak, Penang, and on Pulau Tioman. The leaves are more or less oblong, the upper surface and petiole being covered with short, stinging hairs.

The flowers are produced in axillary panicles and are small and usually purplish. The plant is identical with the devil nettle or fever nettle of India, and is much dreaded by Malays, because in wet weather Malays have been known, in Pahang, to lose their lives on walking unwarily with bare bodies through these nettle trees. Susceptible people faint and are said to develop a rash like that of erysipelas, or are seized with frequent sneezing; all experience great pain, which is always intensified by the application of water.

There are several other kinds of *jělatang*, for instance, *jělatang rusa* or *badak* (*Cnesmone Javanica*, Miq., Euphorbiaceæ). Ridley describes this plant as a climber of no great size which is found in thickets and waste spots. It has a slender stem covered with stinging hairs, oblong, cuspidate leaves, covered with

hairs, and about six inches long and two inches in width; the leaf stalk is from half to one and a half inches long. The inflorescence is a raceme about two inches long, axillary, the upper flowers male, the lower ones female. The flowers are small and green. The capsule is three-lobed, about half an inch long, and covered with strong spiny hairs ('Agricultural Bulletin,' S.S., No. 8, p. 214, December, 1898). *Jelatang rusa* is widely distributed, but is not so poisonous as *jelatang gajah*.

There are also *jelatang ayam* (*Fleurya interrupta*, Gaud., Urticacæ) and *jelatang ular* (*Tragia*, sp. Euphorbiacæ); both are found in Kelantan.

The leaves of *jelatang gajah* are sometimes strung on a cord and tied to the portal of a house to scare away evil spirits. As a poison the flowers and leaves are mixed in cakes in Kelantan with a view to cause death. The stinging nettles are used, according to Vaughan Stevens, by Sakei (or aborigines) with *ipoh* in the preparation of their poisonous darts.

RĚNGAS.

Rěngas is a name given by Malays to several large jungle trees, especially *Melanorrhœa*

Curtisii, Oliv.; M. Wallichii, Hook, fil., and others of the order Anacardiaceæ. These tall handsomely foliaged trees all yield a very fine red, but rather brittle, timber which is sometimes known as Bornean rose wood. The sap is acrid and very poisonous; it is yellow in colour when quite fresh, turns dark red on exposure, and quickly coagulates to a black resin. The sap of *rěngas* sets up an acute dermatitis when it touches the skin, causing smarting with much swelling, followed by a pustular eruption which sometimes ends in a chronic ulceration. Fever and other constitutional disturbances may come on according to the susceptibility of the patient.

The clinical symptoms of *rěngas* poisoning resemble those of "lacquer poisoning," which is described by Scheube as being common in Japan and caused by the lacquer tree (*Rhus vernicifera*, D. C., Anacardiaceæ).

Rěngas timber retains its poisonous properties for years after it has been seasoned, and for this reason, as well as the danger in working it, its economic value is seriously impaired; but some people are far more susceptible to *rěngas* than others. It is never advisable, however, to take shelter under one of these trees

during a rain storm. Timber cutters sometimes protect themselves by smearing their bodies with oil, but death from accidental poisoning is rare.

Internally the juice of *rěngas* acts as a violent irritant, causing vomiting and purging; and its administration is in the highest degree dangerous (Brown, W. Carnegie, 'Jour. Straits Branch, R. A. Soc.,' No. 24, Dec., 1891, p. 84). The *binjai* tree (*Mangifera cæsia*, Jack., *Anacardiaceæ*) is said to have similar poisoning properties to *rěngas*.

As a Malay poison, *getah rěngas*, the sap, is sometimes put into wells, and as a poison for external application it is mixed with *susu katak puru* (lit., the milk of the puru toad), with *gětah binjai*, the sap of a large tree mentioned above, and *děbu kundor*, the waxy secretion which covers the white gourd melon (*Benincasa cerifera*, Savi., *Cucurbitaceæ*). These are put along with the *susu*, or milk of the toad, into a bamboo vessel, and kept until they decompose, when they are transferred to a glass bottle. Decomposition is hastened by the addition of a little water. The *susu* or milk of the toad (*Bufo melanostictus*, Cantor) is obtained by slicing the rough protuberances on the back

of the batrachian ("parotid glands") and collecting the exudation, which is very sticky. This preparation is intended for throwing at the victim, or smearing on his mat or on his skin during his sleep, and is said to cause an incurable eruption like a tinea or ringworm and to cause death.

It is very interesting to note that Kelantan *bomor* use the root of the *binjai* tree in the form of an infusion as an antidote to poisoning by *rěngas*, and similarly that of *rěngas* for poisoning by *binjai*.

Toads are generally considered to be harmless, but in Europe it has been shown that the so-called parotid gland of the toad has a poison allied to bacterial toxins, which when given subcutaneously readily kills mice. In South America a similar secretion is used for poisoning arrows or darts, and is said to kill a jaguar in a few minutes after the receipt of the subcutaneous wound.

JITONG.

Jitong (*Gluta Benghas*, Linn., *Anacardiaceæ*) is a tall jungle tree closely allied to *rěngas*, with foliage and flowers like the horse mango tree (*pokok machang*; *Mangifera foetida*, Linn.,

Anacardiaceæ). The tree yields a hard, black timber with a black sap, and the yellow fruit also contains the black juice, which is nearly as irritating to the skin as *rěngas* sap. Malays say that the skin lesions caused by *jitong* are almost as harmful as those caused by the sea worm (*ulat bulu laut*). As a poison, the sap of the tree (*gětah jitong*) is mixed with the bristles of *ulat bulu laut*, along with the hairs of *buah ringut*, and then smeared on wearing apparel or on a sleeping mat.

Greshoff says that the juice of this tree is used on the island of Siau as an arrow poison, and that a man may be killed by giving the finely powdered bark and root to drink in water.

DĚPU PLANDOK.

Among jungle trees which are poisonous and which are purgative is *děpu plandok*, one of the Thymelæaceæ. Both the root and the fruits, small red berries, are said to be toxic; they are sometimes administered in food as a poison. Seven leaves constitute a full medicinal dose. They are ground up, mixed with a little boiled rice and tumeric, and given by the mouth. Two or three of its allies are recorded by

Greshoff as poisonous to fish ('Med.,' x., p. 121, 1893).

CHĚNGKIAN.

Chěngkian or *chěmkiam* is *Croton tiglium*, Linn., Euphorbiacæ, and this powerful drastic purgative is also given by Malays, either mixed with rice or in water, to those against whom they bear a grudge. It is sometimes put into wells, the dried fruit of the shrub being used, but seldom with a view to cause death. Medically, one seed is sufficient for a dose, and even occasionally excites violent vomiting and purging. Four croton seeds have proved a fatal dose in forty-three hours in the Punjab, and it has been said (Landsberg) that forty croton seeds will kill a horse in seven hours. The root of the croton oil plant is used by Malays as an abortifacient; it is boiled in water and the decoction swallowed from time to time.

An allied plant, *jarak blanda* (*Jatropha curcas*, Linn., Euphorbiacæ), the "semina ricini majoris" of old pharmaceutical writers, is common in Selangor and is known to be poisonous in India, but it does not seem to be used as a poison in Kelantan. Like *Croton* and *Ricinus* it contains a poisonous protein "crotin," *vide*,

Stillmark, 'Pharmak Arbeiten Dorpat (Kobert),' iii, 1889, and Elfstrand, 'Görbersdörfer Veröffentlichungen,' i, 1898, as well as the irritating oil.

BABUTA.

The white sap of a tree called *babuta* or *buta-buta*, from the injury it causes to the eyes (*buta*, blind), is an irritant poison. It comes from the trunk and heavy branches of *Excoecaria agallocha*, Linn., Euphorbiaceæ, and is recognised in India as a native poison under the Hindustani name *ugooro* (Deccan). In Kelantan the *babuta* tree is generally found about the sea-coast; the fruit is a small tri-lobed capsule, green going to black, which ripens in January. In other places it seems from Ridley's description ('Agricultural Bulletin,' S.S. No. 8, December, 1898, p. 218) that a much smaller tree, *Cerbera odollam*, Gærtn., Apocynaceæ, is called *babuta*. This tree or shrub (*Cerbera odollam*) also has a milk-like and very irritant sap; it is found in tidal swamps, the flower is white, and the fruit, which is shaped like a mango, having also a large stone, is reddish green in colour.

Babuta is sometimes used to prevent the

theft of toddy by adding a few drops of the sap to the bamboo collecting cylinders. The victim is said to suffer the agonies of a choleraic seizure. It is also used as a fish poison and, in Samoa, as an arrow poison. It is called *bětah* in Javanese and *goro mata boeta* in the Celebes.

As a Kelantan poison, *babuta* is mixed with the blood of a flying fox (*kěluang*; *Pteropus edulis*, Chiroptera), and on internal administration is said to cause strangury with the appearance of blood in the urine.

It is well known that crews of vessels have suffered from the intensely acrid juice of the *babuta* getting into their eyes when cutting firewood. The following sentence occurs in Powell's 'Poisons' in regard to its use by the Samoan islanders, 1877: "They threw the pounded leaves into the bathing place. . . . The crew rushed to the fresh water to drink and to bathe. They were immediately thrown into convulsive agonies; those who only bathed became blind and those who drank died."

POKOK BATU PĚLIR KAMBING.

Mr. Burkill tells me that this jungle plant or shrub (*Rauwolfia perakensis*, King, and

Gamble, Apocynaceæ) is rather a local plant hitherto found only in Perak and Pahang. It is quite distinct from the better known climber of the same name (*akar batu pělir kambing*; *Sarcolobus globosus*, Wall., Asclepiadaceæ). The flower is white and the fruit in the form of small red berries. It does not seem to be a very poisonous plant when used alone, but the effect is said to be very serious when it is combined with some of the many poisonous aroids, such, for example, as *kěladi chali* (*Alocasia denudata*, Eng., Araceæ), and *likir* (*Amorphophallus Prainii*, Hook. fil., Araceæ).

The poison is prepared by taking the fresh ripe berries and grinding them carefully into a paste (so as to avoid irritation of the skin) with the very acid juice of the two tubers, *kěladi chali* and *likir*. On administration in food the effect produced is said to be great swelling in the throat and fauces, so that the tongue cannot be protruded, and unconsciousness. Malay children sometimes poison themselves by unwittingly eating the berries of *pokok batu pělir kambing*.

The genus *Rauwolfia* contains several known poisonous plants, of which *R. serpentina*, Benth., Apocynaceæ, is perhaps the most

familiar. It contains an alkaloid allied to brucine, which acts on the heart. *R. sinensis*, Hemsl., *R. verticillata*, Baill., and *R. vomitoria*, Afzel., all belong to the same order and are poisonous. The order also contains *Akokantha* and *Strophanthus*, which have a glucoside as the active principle, and many other poisonous plants, including the Oleander. The pink, or "true" Oleander (*pědëndang*, *bunga anis*, *bunga Japun*; *Nerium oleander*, Linn., Apocynaceæ) has been introduced into Kelantan by the Chinese; but the tree does not appear to thrive well, and its poisonous properties do not appear to be known to Malays.

TANGIS SARANG BURONG.

The *tangis sarang burung* tree, *Heynia trijuga*, Roxb., Meliaceæ, is called *duak* or *juak* in Malay States other than Kelantan. It is not a very powerful poison, but the fruit is sometimes mixed with *chandu* (opium prepared for the pipe), or with *chandu dross* (opium re-prepared for the pipe), along with the ripe areca nut (*pinang masak*, *Areca catechu*, Linn., Palmæ), and then used by thieves to stupefy people. *Chandu dross* (*tengkoh*, Ch.) is cheaper

to buy than *chandu*; it is a black, hard, dry stuff, which on the application of heat gives off the peculiar fumes of the opium pipe.

The tree has small whitish flowers, and the fruit is in the form of small, very pretty red berries. Kelantan Malays say that the berries are a fatal poison to birds, hence the name *tangis* (weeping), and *sarang burung* (a bird's nest); but this is denied in Pahang, where the derivation of the word is taken as being due to the berries looking so attractive, but being useless as a food. A dozen half-ripe berries of *tangis sarang burung* freshly gathered in Kota Bharu early in September and given to a sea bird (*burong dahu*: *Leptopilus javanicus*), the lesser adjutant bird, had no effect.

Greshoff says that the bitter extract taken from the seeds of an allied plant (*Heynia sumatrana*, Miq., *Meliaceæ*) was apparently not poisonous ('Med.,' xxv, 1898, p. 40); but Boorsma says that with 50 mgrm. of an extract obtained from the bark and branches he caused an intoxication which was marked, and which after many hours ended in the death of some frogs. A bitter stuff has also been obtained from *tangis sarang burung* (*Heynia triguga*), but it is not a glucoside.

PĚDĚNDANG GAGAK.

A bitter inedible gourd (*pĚdĚndang* or *mentimum dĚndang*; *Trichosanthes wallichiana*, Wight, Cucurbitaceæ) is used as a poison in Kelantan by pounding the ripe fruit and mixing it with opium (*chandu*) and the bile of the porcupine (*ampĚdu landak*). It is a climbing jungle plant with red fruit about the size and shape of a billiard ball, that looks so attractive on the banks of Malay rivers; but these "apples of Sodom" are very bitter, and have been found poisonous by Greshoff. The cherry red fruit (*buah pĚdĚndang*) does not appear to be very deadly; crows feed on it, but are said to be the only birds that will do so.

The name of this plant is intimately connected with the crow which is called *dĚndang* in Kedah, but more generally *gagak* in the other Malay States. A person with bloodshot eyes, "like a ripe *pĚdĚndang* fruit," is referred to in an old Malay romance, the 'Hikayat IndĚra MĚngindĚra.' Bilateral exophthalmos, with red and engorged eyelids caused by thrombosis of the cavernous sinuses and secondary to some septic condition of the face, may have suggested this simile.

AKAR KLAPAYANG.

Akar klapayang or *papayong*; *truah* in Pahang (*Hodgsonia heteroclita*, Hook. fil., Cucurbitaceæ), is a wild jungle creeper found along river banks and in *durian* gardens. The plant has been referred to by natives in Selangor as *kěpayang*, but the two plants are quite different, and confusion is likely to occur if they are not carefully differentiated, because both are of commercial value. *Kěpayang* is a cultivated tree (*Pangium edule*, Reinwdt., Bixaceæ).

The fruits of *akar klapayang* are about seven inches in width and three inches in length with a greenish skin. They generally contain about eight seeds. These seeds, which are said to be poisonous, have recently been examined by Mr. J. B. Eaton, F.I.C., F.C.S., Agricultural Chemist on the staff of the Department of Agriculture, F.M.S. They consist of a hard, flat, outer shell, of a dull drab colour somewhat resembling a mango fruit in shape, but smaller, having an average length of $2\frac{1}{2}$ in. and width of $1\frac{7}{8}$ in. The shell contains a soft oily kernel with a thin pericarp of a dry mealy nature. Mr. Eaton found that on extraction with petroleum

ether the kernels yielded 59·4 per cent. of oil or fat, which amounts to 26·2 per cent. calculated on the whole seed. The raw seed is bitter and probably contains an alkaloidal or some glucosidal substance.

The seeds of *akar klapayang* do not seem to be particularly poisonous; they are frequently cooked and eaten by Malays and the oil is sometimes used in cooking, as a substitute for coco-nut oil ('Agricultural Bulletin of the F.M.S.,' No. 3, vol. ii, October, 1913, p. 67).

In the Malay Archipelago *akar papayang* or *klapayang* is known as *areuj kalajar badak* (Sunda), *batang* (Celebes), *biloengkieng* (Sumatra), and in Padang it is said "twenty seeds give a bottle of oil, to get which the seeds are cut into pieces and placed in the sun to dry for two days; the pieces are then put into a bag made of tree bark and pressed by hand" (Le Clercq).

AKAR BATU PĚLIR KAMBING.

A climbing plant (*akar batu pĚlir kambing*; *Sarcolobus globosus*, Wall., *Asclepiadaceæ*), with a large fruit shaped like the testicle of a goat (hence the Malay name), is often used by Malays to poison dogs, elephants, and cattle.

The plant, which is a long climber with a rather slender stem, is found near the sea-coast, in mangrove swamps, and along the banks of tidal rivers. It occurs in Kelantan, Pahang, Singapore, and Malacca. The botany of *Sarcolobus globosus* is described by Ridley ('Agricultural Bulletin,' S. and F.M.S., vol. xi, No. 7, July, 1903, p. 223).

The leaves are rather thin and fleshy, ovate to lanceolate, three inches long by one and a half wide, with broad, rounded base, and petioles half an inch long, opposite. The flowers are in small clusters on short stalks half an inch long. Each flower is a quarter of an inch across, pale purple in colour, with a few rather broad lobes and very short tube. The fruit is large and oval in outline with a strong keel on one side. It is three inches long and as much through, brown and rough with very small warts. When cut through it is seen to have a thick rind half an inch through, white and pithy and containing, as does the rest of the plant, a quantity of latex.

The yellow fruit, connate just at the base, contains many seeds, rough skinned, with a little albumen round the embryo plant. These seeds are called in Kelantan the *pitis buah*

(*pitis*, a very small denomination of coin such as a Chinese cash, *buah*, fruit), and they are used as a poison, being ground up and mixed with rice. This poison is employed by burglars to kill watch dogs, and causes paralysis in them and other quadrupeds. It is said that the seeds will kill a dog in twenty-four hours.

Like the poisonous yam, *gadong*, the fruit of *akar batu pělir kambing*, can be used as food, and the rind of the fruit is often cooked and eaten as a vegetable, but like *gadong* it is always carefully washed, generally in salt and water, before it is eaten. It is used to make a conserve in Malacca, being cut into pieces and dipped in salt and water for three days, then removed to fresh water for two days, and then put into boiling syrup.

The allied species of *Sarcolobus*, viz., *S. Spanoghei*, Miq., and *S. virulentus*, Griff., are recorded as poisons. The first of these two is called, in Java, *wali kambing*, and is used for destroying tigers. Under the name *S. narcoticus*, Greshoff gives an account of the poisoning of tigers ('Med.,' xxv, p. 138), by putting *S. Spanoghei* into the bait. He extracted a toxic substance from the bark, but did not ascertain its chemical nature.

IPOH BATANG.

The upas, or *anchar* tree of Java (*ipoh*; *Antiaris toxicaria*, Bl., *Urticaceæ*), is described by Ridley as follows: "A gigantic tree, attaining a height of over a hundred feet and a diameter of four or more above the base, where it throws out large buttresses. The bark is grey, about half an inch thick. As nearly all our largest trees do, it drops the lower branches as it grows, so that a large specimen has a perfectly bare trunk for some sixty or eighty feet. The leaves vary very much in size and hairiness; they are generally oblong, acuminate, inequilateral, from four to six inches long, and two or three broad, the leaf-stalk a quarter of an inch long. The backs of the leaves as well as the buds are covered with yellow hairs, and the upper surface of the leaf is more or less hairy, especially in the case of young leaves, though older ones are often glabrous above. The male inflorescence is a small, fleshy green, disc-shaped body on a short peduncle; and the flowers, which are very small, are imbedded in it. The female flowers are very small, solitary, pear-shaped bodies, with a pair of long, thread-like styles. The fruit is globular, succulent, about a third of an

inch long, a velvety drupe, of a deep claret colour, bearing the remains of styles; it contains a single round stone." ('Agricultural Bulletin,' S.S., No. 8, December, 1898, p. 202.) Blume describes the fruit as an elongate ellipsoid drupe as big as a plum.

The juice of the deadly upas tree was formerly used in warfare by Malays, and it is still used as an arrow or dart poison (often in combination with other things) by the Sakei, or aboriginal inhabitants of Malaya, when hunting for food.

At the siege of Malacca by Albuquerque in 1513, it was found that all the Portuguese soldiers wounded by darts died except one man, who was burned with a red hot iron directly after he was pierced, so that ultimately his life was spared. It is still used for shooting men in Borneo.

The composition of arrow and dart poison is complex; it seems that different ingredients are employed by the various wild aboriginal tribes, who still use it in every-day life. The white sap of *Antiaris toxicaria* is an important ingredient. In a short paper entitled "The Poisonous Plants of the Malay Peninsula," Ridley has recorded all that was known about arrow and dart poison fifteen or sixteen years

ago, and gives a bibliography for reference ('Agricultural Bulletin,' S.S., No. 8, December, 1898, p. 199).

The poison, a black sticky stuff, something like black treacle in consistency and colour, is smeared for an inch or more on arrows made from the stem of the *běrtam* palm (*Eugeissona tristis*, Griff., Palmæ). These are either wholly of wood, spear-shaped, with a blade of four inches, and length of shaft about three feet, or tipped with a rough piece of barbed iron.

It is said by Pahang Malays that wounds caused by five arrows from a Sakei bow are sufficient to kill an elephant. Aboriginal tribes in Kelantan (*orang pangan*, inhabiting the Nenggiri district) use two kinds of dart poison, one stronger than the other. They use the *ipoh* sap by itself as a minor poison, but add the young shoots of *gadong* (*sulor gadong*; *Dioscorea triphylla*, Lam., Dioscoreaceæ) when making the more poisonous of their two preparations.

Dart poison used by the "*Pangan*" of Kelantan is prepared in the following way: The fresh and very bitter sap of *ipoh* is collected in bamboo cylinders after tapping the tree; it is then made viscid by partial boiling, the juice of

the *gadong* shoots is added with a little water, and the whole is boiled. It is next poured out on to a board and evaporated to dryness by heating over a fire. The inspissated juice is then very poisonous to handle in its perfectly fresh state, even a little of it under the finger-nails being said to cause death. It is said that an elephant shot in the morning with two *ipoh gadong* darts will collapse before nightfall, and that a monkey will fall dead almost immediately. Leonard Wray has also described the use of *gadong* as a dart poison ('Kew Bulletin,' 1899, Nos. 58-59, ccxix, p. 259). *Gadong* is a wild yam which is also eaten after repeated washings to extract its narcotic properties.

The active principle of *ipoh batang* is antiarin, a glucoside, akin to strophanthin; it has been studied by Seligmann in Borneo ('Journ. of Physiology,' vol. xxix, No. 1, February 23rd, 1903). His experiments on frogs with the crude drug, in such small quantities as .001 mgrm. of antiarin, produced clonic spasms of the muscles, paralysis, and systolic arrest of the ventricles of the heart.

With animals gastro-intestinal symptoms such as vomiting, salivation, and diarrhoea were

conspicuous. Rapid fall of blood pressure and convulsions (clonic spasm) occurred, and paralysis was set up by the pure crystalline glucoside. Birds such as pigeons are susceptible to *ipoh* poison, death being as a rule very sudden, but fowls possess a high natural immunity, as also do pheasants.

A native antidote for dart poison is the juice of the common thin-skinned lime (*limau nipis*; *Citrus acida*, Roxb., Rutaceæ), which is squeezed into the wound, but Kelantan Malays also pin their faith to a mouthful of dry earth eaten immediately on the receipt of the injury. Kelantan Sakei (*orang pangan*) rely upon the fruit of a jungle tree which smells very strongly of onions (*kulim*; *Scorodocarpus borneensis*, Beec., Oleaceæ). The fruit is eaten, or, if it is not available, an infusion is made of the bark. Human urine is also supposed by them to be an antidote on internal administration.

IPOH AKAR.

The jungle climber, *ipoh akar*, or *chettik* of Java (*Strychnos tieuté*, Bl., Loganiaceæ), is also described by Ridley as follows: "A strong

woody creeper, attaining the length of a hundred feet, or less, and a diameter of three inches. The bark is smooth and black; the branches are usually fairly stout, climbing by means of rather large woody hooks, and the leaves are polished dark green, oblong, acuminate, with the characteristic three parallel nerves as in other species, three inches long, and about one and a half wide. The flowers are small and tubular, with four lobes to the corolla, greenish white, and are arranged in short axillary panicles, about an inch long, in pairs. The fruit is a globular berry about two inches through, of a greenish grey colour. The rind, about $\frac{1}{8}$ -inch thick, is woody, but brittle, and encloses a soft whitish pulp, in which are imbedded numerous oblong flattened seeds about half to one inch long, and half or more wide, brown, with a silky coat. Every portion of the plant has an intensely bitter taste, especially the fruit and the pulp enclosing the seeds'' ('Agricultural Bulletin,' S.S., No. 8, December, 1898).

A decoction of the bark is mixed with the sap of the *ipoh batang* tree by the wild tribes in making dart poison in some places. The active principle of *ipoh akar* is an alkaloid

named brucine, which is akin to strychnine. It is most important to distinguish *ipoh batang* and *ipoh akar*. It is believed that the former taken internally is harmless, but the other may well be harmful. Sometimes the wild *orang bukit* (hill men) cut out the flesh round the wound before eating animals killed by darts tipped with *ipoh batang*, but it is uncertain whether they always do so in the case of *ipoh akar*.

CHAPTER V

SOME KAMPONG OR VILLAGE PLANTS USED AS POISONS BY MALAYS

CHĚRAKA.

THE *chěra* plant (*Plumbago rosea*, Linn., *Plumbaginaceæ*) grows in villages and in Malay gardens; it is the same plant as the Hindustani *lal chitra*. It is used by Malay women as an abortifacient. *Chěra* is sometimes called *chělaka* in Kelantan, where it is administered as a decoction made from the root, and often combined with several other plants which for the most part seem to be merely flavouring agents.

These are the *henna* plant (*hina*; *Lawsonia alba*, Lam., *Lythraceæ*), which is commonly used by Malays for dyeing the finger and toe-nails red; the *chěmpaka* (*chěmpaka merah*; *Gardenia Griffithii*, Hook. fil., *Rubiaceæ*), a commonly cultivated plant much prized by

all Malays for its sweet-scented flowers; the *kěnanga* tree (*kěnanga*; *Cananga odorata*, Linn., Anonaceæ), an evergreen with sweet-scented, yellowish flowers; and the *kěněrak* tree, a smallish jungle tree with white flowers (*Goniothalamus tapis*, Miq., Anonaceæ). The roots of all these are boiled for a time with *chěra* root, and the prepared decoction is swallowed from time to time until the desired result occurs. It is so used only in the early months of pregnancy.

The root of *chěra* (*akar chěra*) is sometimes boiled down with *puchok pinang*, the green sprouting shoots of the areca-nut tree (*Areca catechu*, Linn., Palmæ), along with the root of a croton plant (*akar guroh pėriat*; *Croton caudatus*, Griseb., Euphorbiaceæ). This decoction is also given *ad libitum* by the mouth. An antidote, which is swallowed during the resulting hæmorrhage to control it, is made with the root of a pumpkin (*labu ayěr*; *Cucurbita pepo*, Curcubitaceæ) and the root of a spinach (*akar bayam merah*; *Amaranthus gangeticus*, Linn., Amaranthaceæ). Another plant (*pria laut*; *Columbrina asiatica*, Brong, Rhamnaceæ) is used in Pahang and taken in the form of a decoction in order to procure abortion.

The active principle of plumbago root is plumbagin, a peculiar crystallisable, non-alkaloidal principle. It appears to act as a powerful acrid poison, producing pain and tenderness in the stomach, with vomiting, great thirst, and frequent purging. The root has vesicant properties and is sometimes applied by Malay women, who are pregnant, next to the skin, concealed in the folds of the dress (*sarong*), and worn daily with a view to induce uterine contractions by counter-irritations.

Commercial naphthaline, powdered and made into a paste with tumeric (*těmu kunyit*; *Curcuma longa*, Linn., *Scitamineæ*), is used by Kelantan Malays in the same way, and with the same idea.

The direct application of *Plumbago rosea* and *Plumbago zeylanica* to the vagina and uterus causes violent local inflammation. In India the scraped root, bark, and also twigs of these plants are introduced "per vaginam" into the os uteri, often causing death. It is not used in Kelantan by Malays in this way as an abortifacient, and I think rarely, if ever, in the other States. Violent massage is a much more common experiment, but the introduction of foreign bodies into the pregnant uterus is

known to be practised by Malays in the State of Perak.

KĚNĚRAK.

Kěněrak (*Goniothalamus tapis*, Miq., Anonaceæ, or an allied species) does not seem to be used alone as an abortifacient by Malays, but, as seen above, it is used for this purpose, combined with *chěra*ka. A plant which is closely allied to *kěněrak* (*Oxymitra macrophylla*, Baill., Anonaceæ) is recorded by Greshoff as an abortifacient ('Med.,' xxv, 1898, p. 15). He also found indications of an alkaloid or alkaloids in the bark of two species of *Goniothalamus*, and extracted from an allied plant (*Unona dasmychala*, Bl., Anonaceæ) a plant alkaloid, but 12 mgrm. of it did not kill a large toad ('Med.,' xxv, p. 11).

An amorphous alkaloid extracted from *Anona murticata*, Linn. (Anonaceæ) caused tetanic convulsions when injected into a toad to the extent of 3 mgrm.; an injection of 8 mgrm. from *Anona reticulata*, Linn. (Anonaceæ) caused lameness of the hind feet; 5 mgrm. from *Alphonsea ventriculosa*, Hook. fil. and Thoms., Anonaceæ, caused the death of a toad, and 5 mgrm. of the alkaloid extracted from *Alphonsea*

ceramensis, Scheff. (Anonaceæ), caused cramps and death.

PINE-APPLE.

Unripe pine-apple (*nanas*; *Ananassa sativa*, Linn., Bromeliaceæ) is sometimes used by Malay women as an abortifacient; a young green pine-apple about half-grown is either eaten raw, or the fruit is sucked *ad libitum* to absorb the juice. Sometimes salt is added. Pine-apple juice contains bromelin, a proteolytic ferment which acts like pancreatin in neutral or alkaloid media, and it has long been used as an aid to digestion. It is the basis of a well-known peptonised beef jelly preparation. In India the fresh juice is regarded by natives to be poisonous if injected hypodermically (Watt., 'Dict. Econ. Prod. India,' under "Ananas," para. A 1052).

BLACK PEPPER.

Black pepper (*lada hitam*; *Piper nigrum*, Linn., Piperaceæ) in very large doses is probably an irritant poison. It contains an alkaloid, piperine, which was isolated in 1819 by Ersted. The black pepper vine is extensively grown in the Malay Peninsula, and is some-

times used by Malay women as an abortifacient. For this purpose it is made into pills with honey and the so-called "black" variety of ginger root (*halia bara*; *Zingiber officinale*, Roxb., Scitamineæ). The pills are swallowed before meals.

PAPAYA.

The seeds of the *papaya* tree (*bětěk*; *Carica papaya*, Linn., Papayaceæ) are believed by Malays to be abortifacient if eaten in the early months of pregnancy. There is the same popular belief in India, but in Brazil, where they are usually eaten with the fruit, they are reputed to be anthelminthic.

Greshoff obtained the alkaloid carpaine from the fruit and seeds, but more especially from the leaves of *Carica papaya*. This plant alkaloid has more recently been investigated by Barger: it crystallises in monoclinic prisms and has an intensely bitter taste. According to Plugge it depresses the action of the heart and adversely affects the respiration (Henry). The action on the heart is said to resemble that of digitalis.

As a Kelantan poison, the sap (*gětah bětək*) of the *papaya* tree is mixed with the juice of

the immature capsules of the horse-radish tree (*gětah buah gěrmunga*; *Moringa pterygosperma*, Gærtn., *Moringaceæ*), and made up with the white of a lizard's egg (*putěh tělur chichak*; *Hemidactylus frenatus*). The administration of this is said to be followed by great abdominal pain and the presence of blood in the urine.

Gěrmunga is referred to as *morungei* by Ridley in his article on "Malay Drugs" ('Agricultural Bulletin,' S. and F.M.S., No. 7, July, 1906). The bark has been stated by Dymock to contain an alkaloid and two resins; the alkaloid is very bitter, but Greshoff found that it was not fatal to frogs. The horse-radish tree (*Moringa pterygosperma*) is sometimes used as an abortifacient in India, combined with pepper-corns, but it does not appear to be so used in Kelantan.

KĒPAYANG.

The large cultivated tree, *kěpayang* (*Pangium edule*, Reinwdt., *Bixaceæ*), yields a poison. The *kěpayang*, or *payung*, is a large *kampong* tree with huge ovate leaves, rather large axillary greenish-white flowers, and big oblong brown fruits. The large oval fruit in size roughly

resembles a small-sized, unpeeled coco-nut, and may be from seven to twelve inches in length, and three to four or more in width. Some twenty or thirty seeds are contained in each fruit; each of the seeds being nearly two inches in length, roughly triangular, grooved and woody, and enclosed in an oily pulp.

The seeds are the most toxic part of the tree, but apparently only when they are quite fresh. The oil expressed from the raw seeds is administered by Malays in cakes to cause death, and the fresh seeds or nuts are said to be very poisonous to poultry. The poison does not seem to be a very active one, because these seeds, when dry, are often cooked and eaten by Malays. They are known as *kluak* in the Singapore market, and are sold in Java under the same name. Oil expressed from the sun-dried seeds is often used as an article of food in Ulu Pahang and Ulu Kelantan in the "up-country" villages, but it may cause diarrhoea.

When describing the Pahang Disturbances of 1894, Sir Hugh Clifford comments on these fruits as follows: "At spots where the *kěpayang* fruit grew plentifully the refugees had camped for over a week, and many new graves marked

their resting place, for the *kěpayang* bears an ill name" ('Studies in Brown Humanity,' p. 233). He also gives the following translation of a Malay rhyme :

Kěpayang fruit so green and fair,
How like my Love are they !
To eat thereof I do not dare,
Yet cannot throw away !

In November, 1913, the kernel of an old dry *kěpayang* seed obtained from Pahang was given to a lesser adjutant bird (*burong dahu* ; *Leptopilus javanicus*) in Kota Bharu without any effect, and three others were given in rice to four domestic fowls without any result. The seeds are said by Vaughan Stevens to be used in making dart poison by the Sakei, and the bark of the tree is stated to be used as a fish poison.

Kěpayang is not a common tree in lower Kelantan, but its poisonous properties are known, and they are said to resemble those of *gadong*. In upper Kelantan the tree grows well at Kuala Bala on the Kuala Pergau estate ; it thrives also in Selangor, Perak, Pahang, and in the Malay Archipelago generally.

The toxic properties of *Pangium edule*

(*kěpayang*) are contained in a cyanogenetic glucoside, which on hydrolysis by certain enzymes or mineral acids breaks down and yields hydrocyanic (prussic) acid and other substances.

Other genera of the same order (*Bixaceæ*) have oily seeds, and some are useful medicinally—thus, Chalmooogra oil, which is used in leprosy, is obtained pure from the Burmese *Taraktogenos Kursii*, King, and this is used both externally, for various skin diseases, and internally in small quantities, the dose in many cases being increased gradually until nausea results. *Hydnocarpus inebrians*, Vahl., is a substitute for it in Southern India, and *Gynocardia odorata*, Roxb., in Northern India.

Taken incautiously, serious results seem to follow on the swallowing of oils from many plants of these genera. *Hydnocarpus venenata*, Gærtn., gets its name in consequence. As another instance to the point, it may be cited that a specimen of *Hydnocarpus* has recently caused poisoning in Germany, where the oil from the seeds was used for the manufacture of margarine. The seeds contain physiologically active substances called chalmuric and hydnocarpic acids, which cause irritation of the

mucous membrane of the stomach, with consequent nausea and vomiting.

PINANG.

The green fruit of the *pinang* palm (*pinang* or *jěřěkat*, Riau, Johore; *p. kachat*, Kedah, *Areca catechu*, Linn., Palmæ) is sometimes used as a poison in combination with opium prepared for the pipe. The young green shoots are also used as an abortifacient. A group of alkaloids has been isolated from the ripe seeds or nuts known as areca nuts; they were first examined by Bombelon in 1886, and later by Jalms, who identified arecaidine, arecaine, arecoline, and guavacine, together with choline, all belonging to the pyridine group. Arecoline and its salts is highly toxic. According to Meyer, it belongs to the nicotine-pilocarpine group, and acts on the central and peripheral parts of the nervous system, producing paralysis, which may be preceded by convulsions (Henry).

DATURA.

The *kěchubong* or *datura* plant (Solanaceæ) is distributed all over South-Eastern Asia and the Malay Archipelago. It is common almost

everywhere, especially when protected, and the plant is in no way peculiar to Kelantan. The seeds are its most toxic part; and as both varieties of *Datura fastuosa*, Linn., var. *typica* and var. *alba* grow wild anywhere on village (*kampong*), or other soil which is manured, it is not difficult for Malays to collect and use the seeds as a reliable narcotic for the purpose of aiding the commission of theft in dwellings, especially in the native villages of Malaya.

The one-storied house in a rural Malay district is invariably built on posts, and raised some feet above the level of the ground, so that a night thief, having previously poisoned the watch-dogs, can easily burn datura below the house, and convey the fumes to the room above by means of a bamboo tube or pipe.

It is then quite possible for him to cut open the thin plaited wall of split bamboo, and even to remove heavy boxes without disturbing the victims from their stupor. It seems possible that in the process of burning or fuming the alkaloids contained in the plant may be sublimed and drawn into the lungs, in this way causing drowsiness which ends in stupor. As a Malay poison for the purpose of producing lethargy by means of the fumes, *kěchubong*

seeds are sometimes burnt with an incense wood, well known as eagle-wood or lign-aloes (*gaharu*; *Aquilaria malaccensis*, Lam., Thymelæaceæ).

Another incense in the shape of a clear, almost transparent resin known as the cat's eye gum resin (*damar mata kucing*), obtained from the *chěngai* tree, *Balanocarpus maximus*, King, Dipterocarpaceæ, and a similar one obtained from the *lēban* tree (*Vitex pubescens*, Vahl., Verbenaceæ) are used in the same way as an adjuvant.

The favourite mode of administration as a poison by Malays is by the mouth, and the raw seeds of the "black" datura (*fastuosa*) are preferred. About fifty or so of these are crushed and put into tea or coffee, or mixed with rice curry. A hundred dried seeds of *D. stramonium* have proved a fatal dose in Europe, but there is little doubt that the fresh seeds of *D. fastuosa* are even more toxic in the East. When they are used alone, cooked in a curry, they may easily escape detection by the unwary because, although practically tasteless, they are not unlike chilli seeds in appearance.

The seeds are sometimes put into wells and water-jars by Malays to poison the drinking

water, and Ridley records poisoning by a decoction of the leaves and also the dried flowers in Singapore ('Agricultural Bulletin,' S., and F.M.S., July, 1903, vol. xi, No. 7, p. 224).

Kěchubong does not seem to be a direct soporific, and symptoms of poisoning vary in different cases with the dose and the age of the victim. In the main they are those of henbane poisoning, large doses causing dry mouth, dilated pupils, delirium (the patient seeking for and trying to pick up very small objects), and rapid action of the heart, while insensibility often follows within a quarter of an hour. The after effects may last for two days, but are seldom fatal when the drug is used by Malays with the object of profligacy or plunder. The Malay expression *mabok kěchubong* is used of visionary dreamers, and it is said that a form of insanity, attended with hallucinations of sight, and followed by death in a few months' time, is a sequel to the preliminary delirium when *datura* seeds are ground down with certain other things. These are opium prepared for the pipe (*chandu*), the inner green bark of a shrub (*pohun něrapih*; *Glycosmis pentaphylla*, Corr., Rutaceæ); and the

fresh green shoots of a wild yam (*sulor gadong*; *Dioscorea triphylla*, Lam., Dioscoreaceæ).

Opium is the sun-dried latex of the unripe fruit of the opium poppy (*Papaver somniferum*, Linn., Papaveraceæ), which is imported, and when prepared for the pipe is known in Malay as *chandu*. When swallowed by Chinese bent on suicide, *chandu* is sometimes mixed with the lime fruit (*Citrus acida*, Roxb., Rutaceæ), the acid of which is supposed by them to increase the toxic properties of opium.

Another combination of *kěchubong* seeds with *gadong* is to mix them together in the form of dry powder, and add the tissues of the half-rotted *ringut* fruit (*buah ringut*), the fine down of the bamboo (*miang rěbong*), and crumbled up pieces of an edible mushroom (*kulat taun*). A dry powder of this description was exhibited by the police, and a conviction obtained at the Pahang Assizes in Kuantan in July, 1901. In this instance the poison was used by Kedah Malays on Chinese shopkeepers.

A particularly deadly prescription (*rachun běsar*), containing *kěchubong* seeds (dried), is made by the addition of cyanide of potassium and opium (*chandu*), and mixing them together with the bile (*ampědu*) of the green

tree snake and that of the common brown toad.

Another combination in which seeds are used, but not with the idea of causing death, is with opium (*chandu*) and Indian hemp (*ganja*; *Cannabis sativa*, Linn., *Urticaceæ*). In this combination they are mixed with mucus obtained from the cat fish (*ikan kěli*; *Clarius magur*), with the sap of the sago palm (*sagu*; *Metroxylon sagus*, Rottb., and *M. Rumphii*, Mart., *Palmæ*), and the juice from the horse-radish tree (*gěrmunga*; *Moringa pterygosperma*, Gærtn., *Moringaceæ*).

Indian hemp (*ganja*) is smuggled into Kelantan in the form of the dried flowering or fruiting tops of the female plant from which, of course, the resin has not been removed. It is used along with the dried leaves by Punjabis in making the intoxicating drug called *hashish* and the confection called *majun*.

The smallest fragment of these leaves may be detected by the microscopic examination of the hairs with which the leaves are covered. These hairs arise from a short base which is at right angles to the surface of the leaf, but the greater part of the hair is again bent at right angles in such a way as to lie parallel to the

surface of the leaf, and have its point directed to the apex of the leaf. These hairs are unicellular, and all lie parallel to one another and close together. The hairs are thicker and stronger on the upper surface of the leaf and on the veins of the lower surface (Brown, 'Punjab Poisons').

A quaint custom occurs in Kelantan for the nefarious collection of datura seeds. It is to light a candle in mid-day underneath the plant and separate the seeds from their capsules (*buah buah kěchubong*) with a split bamboo stick (*pěranagan*) which has already been used in roasting fish over a fire, and so become scorched and charred.

Some years ago, with the help of Dr. H. E. Durham, I endeavoured to obtain the plant alkaloid from the Malay daturas. Our experiments were done with a full-grown *D. fastuosa*, Linn., var. *alba*, plant growing in Selangor near a stable, and were carried out at the Institute for Medical Research in Kuala Lumpur (the capital of the Federated Malay States). Our preparations were physiologically active in dilating the pupil.

The investigation was continued in the Scientific and Technical Department of the Im-

perial Institute, London, by Professor Wyndham Dunstan, and it was found that the *kěchubong* seeds sent home from Perak, Selangor, and Kelantan contained, in the case of the *Datura fastuosa*, 0·39 per cent. of alkaloid, which was proved to consist almost entirely of hyoscine (scopolamine), while the *Datura fastuosa*, var. *alba*, seeds only furnished 0·21 per cent. of alkaloid, which was found to be chiefly hyoscine with a little hyoscyamine.

The medicinal dose of hyoscine is very small. In British practice the official dose in the form of a hydrobromide is 0·0003 grm. to 0·0006 grm.— $\frac{1}{200}$ to $\frac{1}{100}$ gr. In America it is given in the form of a hydrobromate in slightly larger doses—0·00054 grm., $\frac{1}{120}$ to $\frac{1}{80}$ gr. About eight of the dried *D. fastuosa* seeds weigh 1 grain, so that by calculation it can be found that the ordinary Malay dose, fifty or so, which is given by the thief contains about $\frac{1}{40}$ gr.—0·0016 grm. of hyoscine, which is little more than double a medicinal dose. Serious symptoms of poisoning have been caused by $\frac{1}{25}$ gr. of hydrobromate of hyoscine, but without fatal result (Taylor, 'Medical Jurisprudence,' vol. ii, 1905, p. 758).

The plant might serve as a convenient source

of hyoscyne; it is often used as a medicine by the *bomor*. The botany of *kěchubong* is described by Ridley in the 'Agricultural Bulletin' for 1898, and in greater detail by the writer in the 'British Medical Journal' for 1903, vol. i, p. 1137.

GADONG.

Gadong is a wild yam (*Dioscorea triphylla*, Lam., Dioscoreaceæ, with the synonyms *D. dæmona*, Roxb., generally used by English botanists, and *D. hirsuta*, Blume, by Dutch and German botanists) well known by Malays to possess narcotic properties, and to cause vomiting; it is often used as a poison combined with *datura*. The juice of *gadong*, like that of *kěladi chali*, *Alocasia denudata*, Araceæ, is very acid, and may cause violent inflammation of the eyes; as a Kelantan poison the two tubers may be used in combination for internal administration. The young shoots of *gadong* are used to poison fish, and are often combined with *ipoh* by Sakei in the manufacture of dart poison.

Malays use *gadong* as a food, but take great precautions to prepare it in such a way that it is rendered harmless. The yam must be mature, not newly dug up and wet. It is sun-

dried and then peeled and sliced into thin pieces, which are soaked for three days in a running stream before it is fit for food. Malays sometimes shred it and make it into cakes.

The active principle of *Dioscorea triphylla* (*gadong*) is a plant alkaloid belonging to the pyrrole group. It was obtained by Boorsma and afterwards investigated by Schutte and by Gorter. The alkaloid dioscorine is bitter and poisonous; it produces paralysis of the central nervous system, and in general behaves like picrotoxin (Henry).

In August, 1913, a fairly well-to-do Malay and his son were poisoned by *gadong* mixed with *datura*. It occurred during the fasting month (*bulan puasa*), when no meal is allowed between sunrise and sunset. The two happened to be living alone on the Lundang road in Kota Bharu (the capital of Kelantan), because the man's wife was sick, and was staying at the seaside for a few days; in the interim his married sister prepared their evening meals and sent them to the house.

They returned home about 10 p.m. and found a sweetmeat (*pisang sira*, a conserve made with banana) that had been brought at dusk by a strange girl. The young woman

came and went in a hurry, saying the sister had sent it. The man ate it all except a small piece that he gave to his son, who enjoyed it, but noticed a peculiar earthy taste. They then lay down to sleep and quickly became stupefied; they found they had lost the power of moving their legs, their throats got parched and their heads giddy.

About 4 a.m. thieves broke the door open and plundered the house, while their victims, although awake, were unable to rise and protect themselves. The boy managed to strike a match, but stumbled and fell on attempting to get up; the thieves escaped, but the man was able to recognise one of them.

I saw the patients about 11.30 a.m. the next morning; both had dilated pupils, inactive to light; the man was lying on a mat, he was still dazed, but in a peculiar, cheerful frame of mind. He had had diarrhoea and distension of the abdomen. Both of them still complained of being thirsty, and of pain at the angles of the jaw. An old woman, the boy's grandmother, was looking after them; she was giving the man sips of magic water out of a bowl which contained a charm, as well as some Malay medicine in the shape of a bit of the

heart of the *nipah* palm (*umbut nipah*; *Nipa fruticans*, Linn., Palmæ), an imperfect specimen of a fossilised crab, and a piece of what appeared to be some other sort of fossil were all lying loose in the bowl along with the charm.

On examination, the charm (*tangkal*) appeared to be merely a collection of nine curiously shaped pebbles cleverly strung together by means of silver wire.

They were named by the owner as follows: *batu butir nangka*, a stone shaped like the pip of the Jack fruit (*nangka*; *Artocarpus integrifolia*, Linn., fil., Urticacæ); *batu dalam prut buaya*, a stone said to be taken from the stomach of a crocodile; *isi lōkan*, a fossil, apparently that of a cockle; *batu bēluru*, a stone shaped like the seed of a big creeper (*bēluru*; *Entada scandens*, Linn., Leguminosæ); *batu dalam otak buaya*, a stone said to be taken from a crocodile's brain; *batu bēluru*, another stone similar to the one already mentioned; *buah pinang*, a stone shaped like a dried areca-nut; *batu dalam prut buaya*, another stone similar to the others of the same name already mentioned; and *batu mata pirus*, a greenish-blue stone which may be a turquoise.

The "fossilised crab" (*kětam jadi batu*) had

been borrowed from a friend for the occasion, but no *bomor* had been called in. The name of the other "fossil" was unknown; it was purchased by the grandfather for seventy dollars many years ago from an uncle of the present Sultan. In colour and appearance it somewhat resembled a bit of candied angelica (*Archangelica officinalis*, Hoffm., Umbelliferæ).

The old woman told me that the talisman (*tangkal*) had been in her family for many years, having been bought a long time ago from an Arab for fifty dollars. The general appearance is reproduced in a photograph which was taken in Kota Bharu with her permission, and which is published in the 'Journal of the Straits Branch of the Royal Asiatic Society,' No. 65, 1913. She also told me the charm was a sovereign remedy for sterility, and that it was used in the same way, namely, by steeping the stones in cold water, and then swallowing the magic diluent. It is curious that such an immaterial specific should be credited with such potency. On subsequent inquiry, however, she told me that the charm was no good for this purpose without the aid of a very powerful spell cast by the *bomor*.

None of the stones have the appearance of

a phosphatic calculus, and none of them conform with the usual idea of a bezoar stone (*batu guliga*).

Genuine bezoar stones are generally greenish in colour, smooth, and very light, like the curious concretions (*tabasheer*) that are very occasionally found in the joints of bamboos and in coco-nuts; they have long been used as antidotes to poison. It is believed that the bezoar stone was originally obtained from the intestines of the wild goat of Persia (*Capra ægagrus*, Pall.). In the East the stone (*batu guliga*) is generally met with in small animals, such as the adult monkey (*Semnopithecinae*) and the porcupine, when a nucleus to the stone is often a piece of Sakei dart which has broken off short when the animals have been wounded in their young state.

Malays endow the bezoar stone (*guliga*) with the power of motion, and say that it feeds upon rice much in the same way as the breeding pearl. The usual test for a good one is to place a little lime (*kapur*) on the hand, and rub the stone against it, when, if it be genuine, the lime becomes tinged with yellow.

Skeat, in "Malay Magic," says the ceremony of applying the *guliga* charm generally takes

the form of grating a stone, mixing the result with water, and drinking the potion while repeating the following incantation :

The Upas loses its venom,
And Poison loses its venom,
And the Sea-Snake loses its venom,
And the poison-tree of Borneo loses its venom,
Everything that is venomous loses its venom,
By virtue of my use of the Prayer of the Magic
Bezoar Stone.

Bezoar stones are also worn as amulets against disease and evil spirits, and are supposed to have great magic virtue, but their principal value is founded on their reputed virtue as powerful aphrodisiac agents. To operate in this way one is worn on the navel tied up in a piece of cloth, or water in which one has been soaked is swallowed (F. Kehding, 'Journ. Straits Branch, R. A. Soc.' No. 17, p. 153).

TUBA.

Tuba is a collective name given by Malays to some plants, both wild and cultivated, that have peculiar stupefying properties. They are more especially used as fish poisons. The chief species (*Derris elliptica*, Benth., Legu-

minosæ) is a low-climbing jungle plant with pink flowers, which is often cultivated, especially in Borneo, the branches being encouraged to straggle about on the ground.

There is also a yam with a white flower (*tuba ubi*) as yet undetermined, but apparently closely allied to *Dioscorea birmanica*, Prain and Burkill, and a kind of reed (*tuba sěluang*), with similar properties, but less powerful in effect.

The sap of the *tuba* root (*gětah akar tuba*; *Derris elliptica*) is the effective part; it is commonly used by Malays and Dyaks as a fish poison in the following way: The roots are pounded in water to which lime (*kapur*) is sometimes added; two or three buckets-full of the resulting milk-white watery extract thrown into a river will stupefy fish and bring them to the surface within a certain radius. The fish so stupefied have no ill-effects when used as a food by man.

As an insecticide this watery extract of *tuba* is much used by Chinese gardeners and others, especially for spraying pepper vines. This very valuable property of a local product might well prove to be a practical asset in the destruction of mosquito larvæ in Malaya and in other parts of the world.

As a poison, *tuba* is sometimes put into wells with criminal intent, but death as a result of its use so administered to human beings seems to be rare among Malays. It is said, however, in Kelantan that many young Malay girls have lost their lives by uterine hæmorrhage through using *tuba* as an abortifacient in the form of a decoction made from the root. Acute cases of poisoning are characterised by fixation of the jaws. Native methods of treatment in Sarawak depend on the administration of sugar and immersion of the patient in cold water. The plant and some varieties of it is very common in Borneo, where it is used as a poison. Dyak girls employ it as a means to commit suicide.

A poisonous resin, called tubain by Leonard Wray and derrid by Greshoff, who both extracted it (independently) from *Derris elliptica*, is similar to timboine, nicuoline, and pachyrizin, which occur in other plants of the same order (Leguminosæ). One part of tubain in 350,000 parts, according to Wray, or one of derrid in a much smaller quantity, according to Greshoff, will kill fish in half an hour ('Pharmaceutical Journ.,' 1892, p. 61, and 'Nuttige Indische Planten,' part iii, p. 100).

Several different native names are given to species of *tuba* by Malays. In Kelantan, there are *tuba jěnu* and *tuba katak puru*; in Pahang, *tuba jenerak*, *t. kapur* and *t. sěluang*; in Borneo, *tuba rabut* (with pointed leaf), *t. tedong* (Dyak, rowie), *t. China* and *buah tuba*, the fruit of a tree. In Sarawak the bark of the *pěrkakol* tree is used in the same way as the root of *tuba* in the Malay Peninsula. The sap is said by Newbold to be mixed with *ipoh* by Sakei in the preparation of dart poison, but it is said that the porcupine and the rhinoceros can feed on the roots of *tuba* with impunity.

CHAPTER VI

POISONS OF INORGANIC NATURE USED BY MALAYS

POWDERED GLASS.

As a poison, powdered glass is generally given along with bamboo hairs. Except when in the form of a very coarse powder or large spicules, glass is unlikely to cause much trouble, because, in all probability, it is quickly enveloped in an excess of mucus caused by mechanical irritation. In 1913, a girl patient brought me a dirty scrap of newspaper containing the short fine hairs of a bamboo (*miang rěbong*), mixed with fine particles of powdered glass (*sěrbok kacha*). She said another Kelantan woman, her fellow wife, had recommended it as a reliable medicine for a cold, but as they were jealous of one another, she sought another opinion!

SAND AND QUICKLIME.

A blinding powder, that is to say, a powder used by thieves to disconcert their pursuers, obtained in 1913 from the Kusial district in Kelantan, was found on analysis to be powdered glass (*sěrbok kacha*) and sand containing grains of alluvial tin ore (*bijeh*). The specimen was examined for me by Dr. Dent, M.Sc., Ph.D., F.I.C., Government Analyst, Straits Settlements. Another blinding powder used by Malays for the same purpose is composed of quicklime (*kapur tohor*) and black pepper (*lada hitam*).

CYANIDE OF POTASSIUM.

Cyanide of potassium is commonly bought and sold in Kota Bharu by Malay goldsmiths under the name of *ubat běr-chělup mas* or *potas*. It is used for the purpose of gilding brass and silver, along with "aqua regia" and carbonate of soda. Malay criminals also use it with nitric acid for making counterfeit coin out of brass, copper, and zinc.

As a poison (*rachun besar*), *potas* is mixed with opium (*chandu*) and datura seeds. It is

sometimes mixed with honey. The Dato' Lëla Dërja of Kota Bharu tells me that it is then used in the following way: The poison and honey are smeared on the under surface of a knife, which is then used for dividing a water-melon (*mandëlikëi* or *sëmanka*; *Cucurbita pepo*, Linn., *Cucurbitaceæ*). The criminal eating along with his victim is careful to take the part of the fruit remote from the poisoned side of the blade. Five grains of cyanide of potassium constitute a fatal dose, and even such a small quantity as two and a half grains has caused death. In a highly purified state this poisonous compound contains the equivalent of 41 per cent. of prussic acid.

The Kelantan antidote for poisoning by *potas* is one that is hardly likely to be at hand in an emergency. It is to take the helmet of a hornbill (*tëbang mëntua*, or *burong lilin*), the tusk of an elephant, the bones of the dugong (*duyong*), and rub them down with the root of the white flowered variety of the shoe flower (*bunga raya putëh*; *Hibiscus rosa-sinensis*, Linn., *Malvaceæ*).

In June, 1913, misadventure with *potas* occurred in the house of an astute Malay noble (*Ungku*), who bought a few ounces of it in Kota Bharu with the idea of turning an oxide

of iron into an oxide of tin, and so possibly of "salting" a mine.

During the course of his experiments, a fowl pecked at the cyanide, spun round, and apparently died, but was saved by an antidote. This was prepared on the spot by the wife of the noble in the form of a draught, by rubbing down part of the beak of a small pied horn-bill (*paroh burong tēbang mēntua*) with fresh coconut water.

The supposed virtue of the antidote seems to depend mostly on the properties of a solid, yellow, wax-like stuff which is found on the top of the helmet of this particular horn-bill (*Rhinoplax vigil*, *Bucerotidæ*). The bird is found only in Malaya, and is nicknamed by Malays *tēbang mēntua* (lit., he who chopped down his mother-in-law), in accordance with an old Malay legend. The solid part of the bill is sometimes fashioned by Malays into the form of a small ring and treasured for use in the emergencies of native poisoning. In the case I have recorded, a ring of this kind was used and the antidote acted as an emetic.

Brooches and buttons are also made from the solid part of the bill. Skeat refers to the latter as an amulet: "The horn is of a yellow tinge,

and is made into buttons, which, the Malays say, turn to a livid colour whenever the wearer is about to fall sick, and black when he is threatened by the approach of poison" ('Malay Magic,' Macmillan & Co., London, 1900).

Just such a ring in the form of an amulet is supposed by the country people in Kelantan to be in the possession of the Tungku Besar Tuan Soh, an uncle of the present Ruler of Kelantan. His Highness was much amused when I spoke to him about this local superstition, which is quite unfounded.

MERCURY.

The very poisonous salts of mercury, such as the perchloride, which can be bought in Chinese native medicine shops in large Malay towns, and which is occasionally taken medicinally in over doses, do not appear to be used by Malays as a poison. Mercuric sulphide (*galagar*; cinnabar) may be bought as vermilion, but the only note that I have about mercury as a Kelantan poison is its occasional administration as quicksilver (*raksa*) in combination with datura seeds, opium (*chandu*), and white arsenic.

ARSENIC.

This poison (*tuba tikus*, or *warangan*) is sold every day in the bazaar of Kota Bharu, being bought either as a rat poison or as a medicine. It is generally exposed for sale at Kling medicine stalls or at native Chinese dispensaries in the rather curiously sublimed masses as it comes from the flues of chemical factories. Arsenic is also found as a local product in some of the tin mining districts of Malaya—for example, in Selangor, where Chinese smelters work with tin ore containing arsenic.

When imported, it probably comes from Burma, or from the flues of certain dyeing works in China, more especially perhaps from the fumes condensed from the arsenide of cobalt, which is used in the preparation of zaffre. White arsenic, however, is obtained from many other and much more common minerals—for example, from pyrites, the sulphide of iron and arsenic.

A specimen of *tuba tikus*, bought in the Kota Bharu market in 1905, was analysed for me by Mr. P. Burgess, M.A., Government Analyst, Straits Settlements, at the time, and found by him to be pure arsenious oxide, or white

arsenic. The Malay name simply means rat's-bane. It is sometimes pronounced as *těbal tikus* (*tikus*, a rat) by uneducated Malays.

For use as a poison, *tuba tikus* is pulverised in a mortar with the pips of the lime fruit (*butir didalam limau nipis*; *Citrus acida*, Roxb., Rutaceæ), and then mixed with a meal of cooked rice. The pips of this fruit are said by Malays to increase the poisonous properties of arsenic.

White arsenic is reputed to be one of the chief poisons used by Malays for assassination, but I think criminals seldom use it on account of the violent vomiting it causes. As a deadly poison (*rachun běsar*), it is not only used alone, but sometimes in combination with opium (*chandu*), mercury (*raksa*), and datura seeds. A case of death from acute arsenical poisoning occurred in Kota Bharu in 1910, and again in 1914. In 1910, a Kling traveller put up for the night in an eating-house kept by a fellow-countryman. He found an old mortar and used it in the dark for preparing his curry stuff. The pestle and mortar (*lěsong*) had unfortunately been used for pounding up *tuba tikus* for poisoning rats; it was forgotten that arsenic remained in the mortar, and death by

misadventure resulted. Asiatic cholera was epidemic in the town at the time, and this case formed an instructive clinical picture from the well-known resemblance of acute arsenical poisoning to Asiatic cholera. Death occurred in about seven hours; there was no algide stage, and the motions were dark in colour.

In 1914, a Chinese coolie, guilty of theft, and under arrest, managed to commit suicide by swallowing a dose of powdered *tuba tikus*. He died within eight hours, after violent vomiting and purging. The body was brought by river from a distance, and on examination the poison was recognised by the naked eye in the stomach and intestines with little difficulty.

From a medico-legal point of view it is important to remember that white arsenic arrests decomposition, and that this mineral poison can be found many days and perhaps months after death.

Arsenic and the sulphides of arsenic are generally known to Malays as *warangan*; two of the sulphides are used in the final process of damascening the Malay *kris*, as well as to protect the steel of the blade from rust. The yellow sulphide (*orpiment*) as well as the red sulphide (*realgar*) are used in this process of

damascening (*pamur*); but when the *kris* is deliberately poisoned, the Dato' Lëla Dërja of Kelantan says that the white oxide only is used, mixed with juice of the small chilli.

Warangan putěh (white arsenic) is also smeared on Malay spears and on daggers smaller than the *kris*, either with the idea of preserving the blade or of deliberately poisoning it. Sometimes the blade of a *kris* is dipped in human urine with the idea of rendering penetration more easy when attacking a so-called invulnerable man (*orang kebal*). Even to-day Malays think that certain persons can acquire impenetrability of the skin to shot and steel by means of very powerful charms. About twenty years ago the notorious Malay rebel—the *Orang Kaya* of Pahang—was a case in point. He was endowed with much cunning, great physical strength and courage, and his power of imagination was so remarkable that he could persuade people to believe in the infallibility of his ideas.

APPENDIX I

A SPELL TO CAST OUT FOREST SPIRITS AND DEMONS.

Page 9.

As-salam alaikum, hai maseh di-rimba pënghulu di-hutan,

Yang tanggong sahat bumi,

Putëra disini yang mëmëgang da'erah bumi hutan sini,

Aku tahu asal-mu ;

Nama-mu yang asal-mu-lah yang bërnama Lang Juna,

Jadi charang dewana, jadi gunong Sang Bima,

Jadi (?) pëlana sari maha putih, jadi laut ;

Dengarkan oleh-mu përkataan ku, aku tahu asal
këjadian-mu,

Mu jadi daripada chahaya yang këlam, aku jadi daripada
chahaya yang chërah,

Mu jadi daripada tanah yang halus,

Aku jadi daripada tanah yang kasar, aku jadi tërlëbeh
dahulu daripada mu,

Hai sëkalian Aja-aja di-gunong sini,

Aja-aja di sini, di-luas sini

Dëngar-dëngar kata-ku, kalau mu tidak dëngar aku,

dërhaka-lah mu kapada përbakala Dewa,

Yang sëdia, Dewa yang lënyap,

Dewa yang ghaib pada pandangan, dan pada pëngu-
chapan, tamat.

A CHARM FOR SMALLPOX.

Page 10.

Hai orang baik aku tahu asal-mu,
Kėjadian-mu dudok dalam nĕraka jehannam tiada bĕr-
sifat ;
Maka kamu kĕluar dalam nĕraka jahannam, kamu singgah
kapada anak Adam, baharu-lah kamu bĕrsifat ;
Aku tahu asal-mu tujoh bĕradek,
Kamu jadi daripada dadeh yang hitam, kĕluar daripada
roma yang hitam, kamu kĕluar daripada kulit yang
hitam,
Kamu kĕluar daripada daging yang hitam, kĕluar
daripada darah yang hitam, kamu kĕluar daripada
urat yang hitam kamu kĕluar daripada lĕndir
yang hitam, kamu kĕluar daripada tulang yang
hitam.
Bukan aku yang ampunya tawar, Dewa Bĕntara Narada
ampunya tawar,
Bukan aku yang ampunya tawar, Dewa Sang Sarimba
yang ampunya tawar ;
Bukan aku yang ampunya tawar, hampas nĕraka jahan-
nam yang ampunya tawar ; aku tahu sakalian yang
bisa,
Aku padam sakalian yang nyala,
Jikalau bisa minta tawar, jikalau nyala minta padam,
Sidi guru sidi-lah aku kapada guru-ku, tamat

EXORCISM OF THE VAMPIRE-CRICKET.

Page 11.

Hai Pĕlĕsit aku tahu-kan asal-mu,
Kĕluar daripada Sak Uri Embumi Kĕtuban Bantal,

Mu-keluar daripada darah sambang.
 Kaman nama-mu,
 Jikalau mu tengok ka-langkit muntah darah,
 Tundok ka-bumi muntahkan tahi;
 Demi Allah demi Rasulullah,
 Bërkat la-ilaha ila'llah; Muhammad rasulu'llah.

ALTERNATIVE CHARM.

Page 11.

Hai Sëgërban di-langit, Sëgërban di-bumi,
 Këmbang di-langit këmbang di-bumi,
 Umbang Lëla nama bapa-mu,
 Nagaran nama-mu, Sëmoran nama hamba-mu,
 Mu pindah-lah dëngan kuasa Allah,
 Bërkat la-ilaha ila'llah; Muhammad rasulu'ilah.

AN INCANTATION FOR SNAKE-BITE, STINGS OF SCORPIONS, STINGS OF CENTIPEDES, AND OTHER POISONS.

Page 11.

As-salam alaikum,
 Ong tawar maha tawar,
 Aku handak tawar daging,
 Aku handak tawar darah, handak tawar di-lëndir,
 Handak tawar di-tulang;
 Tawar datang daripada Allah, tawar datang daripada
 Muhamad;
 Tawar datang daripada Baginda Rasulullah, tamat.

A CHARM FOR ANY KIND OF POISONING.

Page 12.

Ong tawar maha tawar,
Tawar saratus sēmbilan puloh,
Bukan aku punya kēhandak punya tawar sakalian bisa.
Kēluar daripada biji yang hijau :
Yang bisa aku handak minta tawar rachun didalam
 badan manusia,
Jika ěngkau tiada tawar aku sumpah dēngan kata Nabi
 Isa yang ampunya tawar :
Insha'llah.

ALTERNATIVE CHARM.

Page 13.

Ong tawar maha tawar, tawar saratus sēmbilan puloh,
Bukan aku ampunya tawar, dato' Měngkadam puteh
 yang ampunya tawar,
Turun tawar daripada gurda yang puteh,
Turun tawar daripada gajah yang puteh,
Turun tawar daripada batu yang puteh, turun tawar
 daripada darah yang puteh,
Turun tawar daripada tulang yang puteh, turun tawar
 daripada hati yang puteh ;
Ayer laut aku tawar,
Lagi'kau aku tawar,
Jika bisa minta tawar, jika nyala,
Minta padam !

A CHARM FOR ONE WHO IS DAZED—THE WILL-O'-THE-
WISP.

Page 14.

As-alam aleikum hai Jin ibni Jan!

Iblis anak Sěrdan Pěraum!

Aku ini-lah Iblis anak Sěrdan Pěraun, aku-lah Dato'

Panchong maha buta,

Panchong tiada běrtanya,

Bunoh tiada běr-dosa!

Aku-lah raja sakalian yang běrnnyaawa, hak.

APPENDIX II

BOTANICAL CLASSIFICATION IN NATURAL ORDERS OF THE POISONOUS PLANTS.

- | | |
|---------------------|--|
| I. Anonaceæ | <i>Alphonsea ceramensis</i> , Scheff.
<i>A. reticulata</i> , Linn.
<i>A. ventriculosa</i> , Hook. f. &
Thoms.
<i>Anona murticata</i> , Linn.
<i>Cananga odorata</i> , Linn.
<i>Goniothalamus tapis</i> , Miq.
<i>Oxymitra macrophylla</i> , Baill.
<i>Unona dasmychala</i> , Bl. |
| II. Papaverceæ | <i>Papaver somniferum</i> , Linn. |
| III. Capparidaceæ | <i>Gyandropsis pentaphylla</i> , D.C. |
| IV. Dipterocarpaceæ | <i>Balanocarpus maximus</i> , King. |
| V. Rutaceæ | <i>Citrus acida</i> , Roxb.
<i>Glycosmis pentaphylla</i> , Corr. |
| VI. Malvaceæ | <i>Hibiscus rosa-sinensis</i> , Linn. |
| VII. Bixaceæ | <i>Gynocardia odorata</i> , Roxb.
<i>Hydnocarpus inebrians</i> , Valh.
<i>H. venenata</i> , Gærtn.
<i>Pangium edule</i> , Reinwdt.
<i>Taraktogenos Kursii</i> , King. |
| VIII. Meliaceæ | <i>Heynia sumatrana</i> , Miq.
<i>H. trijuga</i> , Roxb. |
| IX. Anacardiaceæ | <i>Gluta benghas</i> , Linn.
<i>Mangifera cæsia</i> , Jack.
<i>Melanorrhœa Curtisii</i> , Oliv.
<i>M. Wallichii</i> , Hook. f.
<i>Rhus vermicifera</i> , D.C. |

X. Moringaceæ	<i>Moringa pterygosperma</i> , Gærtn.
XI. Leguminosæ	<i>Derris elliptica</i> , Benth. <i>Entada scandens</i> , Linn. <i>Glycine hispida</i> , Maxim. <i>Mucuna gigantea</i> , D.C.
XII. Lythraceæ	<i>Lawsonia alba</i> , Lam.
XIII. Papayaceæ	<i>Carica papaya</i> , Linn.
XIV. Cucurbitaceæ	<i>Benincasa cerifera</i> , Savi. <i>Cucurbita pepo</i> , Linn. <i>Trichosanthes wallichiana</i> , Wight.
XV. Umbelliferæ	<i>Archangelica officinalis</i> , Hoffm.
XVI. Rubiaceæ	<i>Gardenia Griffithii</i> , Hook. f. <i>Uncaria Gambia</i> , Roxb.
XVII. Plumbaginaceæ	<i>Plumbago rosea</i> , Linn. <i>P. zeylanica</i> , Linn.
XVIII. Oleaceæ	<i>Scorodocarpus borneensis</i> , Beec.
XIX. Apocynaceæ	<i>Cerbera odollam</i> , Gærtn., var. lactaria. <i>Nerium oleander</i> , Linn. <i>Rauwolfia sinensis</i> , Hamsl. <i>R. perakensis</i> , King & Gamble. <i>R. serpentina</i> , Benth. <i>R. vomitoria</i> , Afzel.
XX. Asclepiadaceæ	<i>Sarcolobus globosus</i> , Wall. <i>S. Spanoghei</i> , Miq. <i>S. virulentus</i> , Griff.
XXI. Loganiaceæ	<i>Strychnos tieuté</i> , Bl.
XXII. Verbenaceæ	<i>Vitex pubescens</i> , Vahl.
XXIII. Amaranthaceæ	<i>Amaranthus gangeticus</i> , Linn.
XXIV. Piperaceæ	<i>Piper nigrum</i> , Linn.
XXV. Thymelæaceæ	<i>Aquilaria malaccensis</i> , Lam. “Děpu plandok.”

APPENDIX III.

A LIST OF KELANTAN POISONS.

Malay name.	Page.	Scientific name.	Habitat.	Active principle.	Pharmacology.
<i>Ampědu</i> .	26	Fel (gall or bile) .	—	Undetermined	Used as an excipient in various poisonous preparations. Used with <i>ringut</i> . Ditto.
” <i>běruang</i> .	36	Helarctos Malayanus	Kelantan	”	”
” <i>burong chěchawi</i>	27	Dissemurus platurus	”	”	”
” <i>burong gagak</i>	37	Corvus macro-rhynchus	”	”	”
” <i>ikan buntal</i> .	35	Tetrodon fluviatilis	” (rivers)	”	”
” <i>ikan kěli</i> .	82	Clarius magur .	” (padi swamps)	”	Used with datura; fish not otherwise poisonous. Used with <i>ringut</i> . Given with gambier in chewing betel.
” <i>katak lěmbu</i> .	36	Megalophrys nasuta	”	”	A favourite excipient for vegetable irritant poisons.
” <i>katak pisang</i>	26	Rana erythræa .	” (ponds)	”	Used with opium and <i>pěděndang gagak</i>
” <i>katak puru</i> .	26	Bufo melanostictus	”	”	Given alone; also combined with datura and cyanide of potassium.
” <i>landak</i> .	55	Hystrix longicauda	”	”	”
” <i>ular puchok</i>	27	Dryophis prasinus .	” (trees)	”	”

<i>Chabutong</i> .	30	<i>Spirostreptus</i> .	Kelantan (thick forest)	Undetermined	Expressed juice used with <i>ringut</i> .
<i>Chichak</i> .	73	<i>Hemidactylus</i> <i>frenatus</i>	Do. (houses)	"	White of the egg used with <i>papaya</i> .
<i>Dëndang</i> .	31	<i>Coleoptera</i> .	"	Cantharidin	A single beetle in cakes a poisonous dose.
<i>Gëronggong</i> .	36	<i>Scyphozoa</i> .	China Sea	Undetermined	Used with <i>ringut</i> .
<i>Ikan buntal</i> .	21	<i>Tetrodon fluviatilis</i>	Kelantan (rivers)	"	Whole fish poisonous.
" <i>këli</i> .	20	<i>Clarius magur</i> .	Do. (padi swamps)	"	Gall used with datura, fish not otherwise poisonous.
" <i>pari</i> .	23	<i>Trygon</i> .	China Sea	"	Spines poisonous.
" <i>sëmbilang</i> .	19	<i>Plotosus</i> .	"	"	Fins poisonous.
<i>Jëlantor</i> .	37	<i>Spirostreptus</i> .	Kelantan (forest)	"	Same as <i>chalutong</i> .
<i>Këchar lakum</i> .	30	<i>Nanina hum- phreysiana</i>	Do. (villages)	"	Expressed juice used with <i>ringut</i> .
<i>Këluang</i> .	51	<i>Pteropus edulis</i> .	"	"	Blood used with <i>babuta</i> .
<i>Kura katup</i> .	19	<i>Cyclemys amboi- nensis</i>	"	"	Used as a decoction with the cobra.
<i>Pinang kotai bukit</i>	35	<i>Zephronia</i> .	" (hills)	"	Expressed juice used with <i>ringut</i> .
<i>Ular tédong sendok</i>	19	<i>Naia tripudians</i> .	Kelantan	A neurotoxin	Used as a decoction with the tortoise.
<i>Ulat bulu darat</i> .	30	Caterpillar of moth, <i>Aloa sanguinolenta</i>	" (villages)	Undetermined	Hairs used with <i>ringut</i> .
" <i>bulu laut</i> .	21	<i>Chloia flava</i> .	China Sea	"	Bristles used with <i>ringut</i> .
<i>Babuta</i> .	50	<i>Excœcaria agallocha</i>	Kelantan (coast)	"	Used with the blood of the flying-fox, juice causes blindness.

A LIST OF KELANTAN POISONS—continued.

Malay name.	Page.	Scientific name.	Habitat.	Active principle.	Pharmacology.
<i>Batu pëlir kam-bing pokok</i>	51	<i>Rauwolfia perakensis</i>	Kelantan (river banks)	Undetermined	Fruit used in combination with wild yams.
<i>Batu pëlir kam-bing akar</i>	57	<i>Sarcolobus globosus</i>	Do. (coast)	"	Seeds (<i>pitis buah</i>) used to poison dogs.
<i>Bërkat</i>	40	<i>Arenga saccharifera</i>	" (hills)	"	Pulp of fruit used.
<i>Bètek</i>	72	<i>Carica papaya</i>	" (plains)	An alkaloid carpaine	Sap used; also seeds.
<i>Binjai</i>	46	<i>Mangifera cæsia</i>	" (villages)	Undetermined	Sap used with <i>rengas</i> .
<i>Bërèdin</i>	38	<i>Caryota mitis</i>	" (hills)	"	Berries used in wells.
<i>Chandu</i>	80	<i>Papaver somniferum</i>	India, China	Alkaloids, morphine, etc.	Used with datura, arsenic, <i>pinang</i> , etc.
<i>Chèngkian</i>	49	<i>Croton tiglium</i>	Kelantan	Obscure	Root as an abortifacient.
<i>Chëraka</i>	67	<i>Plumbago rosea</i>	" (villages)	Plumbagin (non-alkaloidal)	Ditto.
<i>Damar lëban</i>	79	<i>Vitex pubescens</i>	" (forest)	Undetermined	Sap as an adjuvant for burning with datura.
" <i>mata kuching</i>	79	<i>Balanocarpus maximus</i>	" "	"	Sap as an adjuvant for burning with datura.
<i>Daun gatal</i>	42	<i>Laportea crenulata</i>	" (ravines)	"	Flowers and leaves used in cakes.
<i>Dëbu kundur</i>	46	<i>Benicasa cerifera</i>	" (villages)	"	External secretion used with <i>rengas</i> .
<i>Dëpu plandok</i>	48	(Undetermined)	" (plains)	"	Berries used.

<i>Gadong</i>	85	<i>Dioscorea triphylla</i> .	Kelantan (villages)	An alkaloid dioscorine Undetermined	Young shoots, also tuber used.
<i>Gaharu</i>	79	<i>Aquillaria malaccensis</i>	Do. (forest)		Bark as an adjuvant for burning with datura.
<i>Gěrmunga</i>	73	<i>Moringa ptery- gosperma</i>	" (villages)	An alkaloid	Immature capsules given with <i>papaya</i> .
<i>Hina</i>	67	<i>Lawsonia alba</i>	" "	Undetermined	Root used, probably only as a flavouring agent.
<i>Ibul</i>	37	<i>Orania macrocladus</i>	" (hills)	"	Seeds used.
<i>Ipoh akar</i>	64	<i>Strychnos tieuté</i>	" (river banks)	An alkaloid brucine	Bark used; arrow and dart poison.
" <i>batang</i>	60	<i>Antiaris toxicaria</i>	" (forest)	A glucoside antiarin	Sap used; arrow and dart poison.
<i>Jělatang</i>	42	<i>Laportea crenulata</i>	" (ravines)	Undetermined	Same as <i>dawn gatal</i> .
<i>Jitong</i>	47	<i>Gluta benghas</i>	" (coast)	"	Sap used with <i>ringut</i> .
<i>Kabung</i>	39	<i>Arenga saccharifera</i>	" (hills)	"	Same as <i>běrkat</i> .
<i>Kěpayang</i>	73	<i>Pangium edule</i>	" (villages)	Cyanogenetic glucoside	Oil expressed from the fresh seeds used as a poison.
<i>Kachang rimau</i>	42	<i>Mucuna gigantea</i>	" (river banks)	Undetermined	Leaves very irritating to the skin.
" <i>bulu rimau</i>	41	<i>Glycine hispida</i>	" (villages)	"	Hairs scraped from the dry pods used.
<i>Kěhubong</i>	77	<i>Datura fastuosa</i>	" "	Alkaloids, hyoscine and hyoscyamine	Whole plant poisonous; seeds specially used.
<i>Kěladi chali</i>	52	<i>Alocasia denudata</i>	" "	Undetermined	Yam used with <i>pokok batu</i> <i>pětir kambing</i> .
<i>Kěnanga</i>	68	<i>Cananga odorata</i>	" (plains)	"	Root used, probably only as a flavouring agent.

A LIST OF KELANTAN POISONS—continued.

Malay name.	Page.	Scientific name.	Habitat.	Active principle.	Pharmacology.
<i>Kěněrak</i> .	70	<i>Goniothalamus tapis</i>	Kelantan (plains)	(?) An alkaloid	Root used as an abortifacient in combination with <i>chěra</i> ka.
<i>Klapayang (akar)</i>	56	<i>Hodgsonia heteroclita</i>	Do. (river (banks)	(?)	Raw seeds said to be poisonous.
<i>Lada hitam</i> .	71	<i>Piper nigrum</i> .	„ (villages)	An alkaloid piperine	Dry seeds given with ginger and honey in form of a pill.
<i>Langkap</i> .	39	<i>Arenga obtusifolia</i> .	„ (hills)	Undetermined	Same as <i>kabung</i> .
<i>Likir</i> .	52	<i>Amorphophallus Prainii</i>	„ (villages)	„	Yam used with <i>pokok batu pěr</i> ir <i>kambing</i> .
<i>Měředin</i> .	38	<i>Caryota mitis</i> .	„ (hills)	„	Same as <i>běředin</i> .
<i>Miang řebong</i> .	40	<i>Bambusa blumeana</i> .	„ (villages)	„	Hairs used with <i>ringut</i> and powdered glass.
<i>Nanas</i> .	71	<i>Ananassa sativa</i> .	„	Proteolytic ferment bromolin	Juice of raw unripe fruit used as an abortifacient.
<i>Nerapih</i> .	80	<i>Glycosmis pentaphylla</i>	(plains)	Undetermined	Inner bark used combined with <i>datura</i> and <i>chandu</i> .
<i>Papaya</i> .	72	<i>Carica papaya</i> .	„ (villages)	An alkaloid carpaine	Sap used ; also seeds.
<i>Pěđěndang gagak</i>	55	<i>Tricosanthes wallichiana</i>	„ (river (banks)	Undetermined	Fruit used with opium and the bile of the porcupine.
<i>Pinang</i> .	77	<i>Areca catechu</i> .	„ (villages)	Alkaloids, arecoline and others	Green fruit used with opium.

<i>Rěngas</i> .	44	Melanorrhœa Curtisii	Kelantan (forest) Do.	Undetermined	Sap used with the "milk" of a toad.
<i>Ringut</i> .	34	Epipremnum giganteum	"	Undetermined.	Half-rotted fruit commonly used with many other irritants.
<i>Rumpai</i> .	42	Laportea crenulata .	" (river banks)	"	Same as <i>jelatang</i> .
<i>Tangis sarang burong</i> .	52	Heynia trijuga .	" (plains)	"	Berries used with opium and areca nut.
<i>Tuba</i> .	91	Derris elliptica .	" (villages and plains)	A resin, tubain derrin	Sap of root used mostly to poison fish.
<i>Tukas</i> .	38	Caryota mitis .	" (hills)	Undetermined	Same as <i>běředin</i> .
<i>Bijeh</i> .	96	Grains of alluvial tin	"	A mechanical irritant	Used as a blinding powder by thieves.
<i>Kapur tohor</i> .	96	Quicklime .	"	Ditto	
<i>Potas</i> .	96	Cyanide of potassium	Imported	A cardiac poison	Used alone and combined with datura and opium.
<i>Raksa</i> .	99	Mercury (quicksilver)	"	Obscure (? mech- anical)	Seldom used.
<i>Sěrbok kacha</i> .	96	Powdered glass .	"	A mechanical irritant	Used with bamboo hairs.
<i>Tuba tikus</i> .	100	White arsenic .	"	An irritant poison	Used with the pip of the lime fruit as a rat poison.
<i>Ubat-běrchělup mas</i> .	96	Cyanide of potassium	"	A cardiac poison	Another Malay name for <i>potas</i> .
<i>Warangan putěh</i> .	103	White arsenic .	"	An irritant poison	Another Malay name for <i>tuba tikus</i> .

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